

THE DISCOVERY SERIES . BOOK ONE

ADVENTURE
BOUND

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THE DISCOVERY SERIES . . . BOOK ONE

910
per ✓
**ADVENTURE
BOUND**

Edited by

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New Trier Township High School

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Co-author of What Makes a Book Readable

Cartoons by Fred G. Cooper



HARCOURT, BRACE AND COMPANY

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1945

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TEACHER'S INTRODUCTION

DURING the past three decades the reading interests and habits of children and young people have been studied with increasing care and thoroughness. As a result, evidence has accumulated which shows clearly that certain principles should be observed if teachers are to be successful in promoting keen interests in reading and in initiating pupils on life-long adventures in independent reading.

Of large importance is the fact that much of the reading material assigned in English and literature classes should bear upon themes or activities which are clearly related to the current needs and interests of children. Furthermore, the motives for reading which are adopted should not only be stimulating but should be recognized by the pupils as significant and worth-while. In addition, the materials read should relate to a wide range of interests. The adoption of these principles insures a strong appeal to most, if not all, the pupils in the upper-grade and high-school classes. It has the added advantage of developing numerous wholesome interests on which subsequent independent reading activities may be based.

But satisfactory results cannot be secured unless the materials used in class can be read with ease and understanding. Unfortunately, this has often not been the case for a large majority of pupils. As a result, many of them fail to grasp significant items of content and to participate

intelligently in class discussions. Even more significant is the fact that many pupils acquire a genuine distaste for reading and fail to make normal progress in the development of reading habits, or indeed, fall into careless, inadequate habits of reading. One means of avoiding these undesirable outcomes, as shown clearly through classroom experiments, is to make use at particular grade levels of simpler reading materials than have normally been assigned in the past.

The editors of *Adventure Bound* have attempted to meet the foregoing needs in various ways. They have endeavored, first of all, to determine experimentally both the general themes and the specific selections that are highly charged with interest and yet of educational value to ninth-grade pupils. Furthermore, they have chosen from the many selections which meet these standards those which are relatively simple for normal groups at that grade level. In making their final selection they have taken advantage of recent studies of the factors that contribute to ease or difficulty in reading materials.

The book, therefore, marks a distinct step forward. It is based on a clear recognition of the reading needs of pupils at a level at which they have frequently been disregarded. It is anticipated that its use, particularly by pupils who encounter more than the usual amount of difficulty in reading, will result both in broadened interests and in more fluent habits of intelligent reading.

Department of Education
University of Chicago
January 6, 1936

WILLIAM S. GRAY



A PREFACE FOR TEACHERS

THE Editors hope that *Adventure Bound* will answer the pressing need for special materials for pupils who, because of immaturity of interest or ability, react negatively to traditional literary content. They hope, too, that the book will furnish remedial reading for the retarded pupil—the one who has grown book-shy from long struggling with traditional subject matter. For both these types of reader, *Adventure Bound* answers the requirements of simplicity and interest. With such selections as it provides, the discouraged reader may gain confidence in his own ability. And it is on confidence that improvement depends.

Adventure Bound is a "classroom" answer to the request of many teachers for special reading materials. The selections were chosen by the pupils themselves over a period of four years when their reading contacts were not restricted to the purely literary and when hundreds of books were always available in the classroom for sampling or intensive reading.

Thus, *Adventure Bound* is an obvious departure from the usual literature text. It provides no experience with literary masterpieces. Instead, it builds upon the needs of pupils and upon those reading experiences which they have found interesting and desirable. It furnishes straightforward narrative and exposition, the two types which pupil-readers most heartily recommend to their fellow

classmates. It is not concerned with the experiences which teachers have *thought* all pupils should enjoy.

The traditional literary selections offer three handicaps for a pupil who has reading difficulties: they often do not arouse his interest; they may be too mature in content or subtle in expression; and they may be structurally too difficult. By keeping a careful record over a period of years of books which students enjoyed reading, the editors were able to discover a group of selections which were not too difficult in content yet possessed intrinsic interest. Then to eliminate the third difficulty — to make sure these pupil-choices were structurally simple — the editors checked each selection by the Gray-Leary formula. Thus, the simplicity as well as the interest of the content found in *Adventure Bound* is assured.

Among the many benefits to be derived from this book, the editors believe that one of the most important will be a greater appreciation of human accomplishment. Those who read this book may become more appreciative of the courage, the resourcefulness, and the perseverance that together have brought successes in this land of daily miracles. Perhaps, then, these daily miracles may be taken less for granted.

For critical reading of the manuscript grateful acknowledgment is made to Dr. William S. Gray of the Department of Education, the University of Chicago. In addition, the editors wish to thank the following persons and libraries for their valuable assistance in developing the project materials which form the basis of the selections in *Adventure Bound*: Miss Helen R. Sattley for her investigations of student reading interests; Mr. Harry H. Herron, and his office practice classes for clerical assistance in pre-

paring unit materials which were later included in this edition; the librarians in Evanston, Wilmette, and Winnetka, Illinois, for the loan of books for testing reading interest and effect of format features; and those people, who, by their active interest in reading problems, consciously and unconsciously helped to work out the numerous details of *Adventure Bound*.

Special acknowledgment is made to Dr. William S. Gray for preparing the Introduction.

CHESTER L. PERSING

BERNICE E. LEARY

1936

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WITH AIR MAIL PILOTS

THE SPIRIT OF THE NIGHT AIR MAIL

by Captain Burr Leyson

MINUTES were important things in the life of young Jimmie Nielson. Minutes ahead of schedule, minutes behind schedule, these were the things that counted. He prided himself on setting down his two-and-one-half-ton monoplane on the scheduled second. Storm and the hazards of weather were incidental, something to be fought and conquered. He was a pilot, a skilled man in a highly technical profession. Instruments were his weapons. He did not half depend upon instinct as those before him had been forced to do. He knew what he was doing and, regardless of conditions around him, sat calm and detached, serene in his faith in the knowledge mechanical aids brought him.

The ceiling lowered, sank to less than forty-five hundred feet. For a time he flew below the clouds, plunging through occasional low-hanging banks that cut the earth, with its scattered lights and rotating beacons, from view. Gradually he was forced lower and lower. He watched the altimeter. Finally its reading showed him that he was getting to a dangerously low level; there was scant room between the night-enveloped hilltops and the hurtling ship. It was time to go up, enter into the blinding blanket of the clouds and fly blind, following the invisible beam of the radio beacon to guide him through to his destination.

He eased back on the controls and the earth left him. He flew in the murk.

Now he concentrated on his instruments. His eyes roved over the dials. All was well. He settled down in his cockpit to the grind of the flight. The steady beat of the radio beam was broken and the dry voice of the announcer brought him a promise of clearing skies ahead. Then the beam resumed its monotonous tempo.

Suddenly as his eyes swept over the instruments, they came to an abrupt stop and froze on the pyrometer that registered the temperature of the cylinder heads on the motor. Its needle was slowly and ominously moving through the scale toward the red section. Danger!

He attuned his ear to the beat of the motor. As yet he could detect no falter in its steady dissonant roaring. But the instrument was far more delicate than his ear. He knew that it was but a matter of time. That rapid increase in temperature was a certain indication of trouble. He could expect it momentarily. He had not long to wait.

The tachometer hand fluttered, then dropped full fifty revolutions. For a moment it steadied there, then dropped still more. The exhaust grew ragged and broke into a series of hoarse coughs as the unburned gases from a failing cylinder rushed out into the collector ring and were exploded by the flame. The ship grew heavy, lost its buoyancy as the motor lost its pull and the controls grew limp under his hand. He was going down, down through the night into he knew not what.

* * *

Back at the base, Old Pop Connors leaned his chair against the wall and gazed at the ceiling of his office. He pursed his lips and stroked his chin, a sure sign that he

was deep in thought. Suddenly he emitted an explosive "Huh!"

"You newspapermen sure can think of some funny questions," he addressed the man seated opposite him. "How do the youngsters who have come into the flying game compare with the old timers? What is the difference between them, if any?" Pop slowly repeated the other's questions. For a time he continued to stare at the ceiling and then he suddenly brought his chair to the floor, leaned forward and spoke to Bill Bowen, the man who had questioned him.

"I'll tell you, Bill," Pop began, "I don't mind admitting that your question is sort of hard to answer. Don't let anyone tell you these youngsters who have come into the game of late can't fly. They can. They can pick 'em up and set 'em down with the best of them. But, there is a difference between them and the old timers on the night air mail. There isn't the same spirit in them that there was in the old timers. Here's why:

"The old timers were pioneering, they were out to show the public that flying was more than a circus stunt. They went through regardless of anything. Their slogan was 'The mail must go' and it was no joke, although they laughed at it. The honor roll of pilots lost in the service proves that!

"Now, these youngsters have radio and enough instruments to fill a showcase. There is no guesswork about their flying. All this gives them a different viewpoint. Flying the night air mail is just a job to them. It's a matter of cold science and as a result the spirit is different. The old spirit of the night air mail is no more, dead, killed by science."



Bill Bowen leaned forward and hastily scribbled some notes on a piece of paper. Old Pop was an authority; he knew whereof he spoke. He was not only an old pilot but he knew pilots as few did. Bowen could see an article in what Old Pop had said. He'd caption the piece, "The Spirit of the Night Air Mail is Dead!" His authority for the statement was Old Pop Connors, head of the far-flung Connors Air Lines. Bowen felt that he had a great article, one that would make the past live again and bring to life some of the heroic incidents of the old night air mail. With thanks to Pop, he rose and left while Old Pop sat in his chair, thinking of the "good old days" and regretting their passing after the manner of veterans from time immemorial.



Out in the night, as his plane settled through the sable depths of the clouds, Jimmie Nielson's mind worked at lightning speed. He calculated his position and checked his figures with the radio range indicator and his chronometer. He was over a range of low rolling wooded



Inverts ship, dumping mail into the night, safe from the roaring flames.



Then bails out, well singed himself, to locate mail and carry on.

hills, and wide valleys that lay between them would probably afford him a place to land. Methodically and coolly he prepared to meet the emergency.

He broke from the clouds and saw below a flat black plain dotted dimly with clusters of lights. These were the small towns that lay along the route. Ahead was a beacon, its back flashing red to denote that no landing field lay at its base. He read its identification signal in the flashes and noted with satisfaction that he was dead upon his course, not more than half a mile from where he had estimated his position.

His hand reached for the parachute flare release to drop a flare so that he could light up the countryside below and choose a suitable landing place if one were present. Every move was calculated and calm. He knew what he was doing and had at hand the means to combat the emergency. He felt no undue alarm; rather, he was mildly annoyed at the interruption to his smooth progress. He felt that the delay was avoidable. The mechanical element in his flight did not fail without reason. The human element, represented by those who had serviced the plane,

had failed. They had not performed their part of the job efficiently.

So he thought as he pulled the flare release. A moment later the countryside below was bathed in a cold, hard brilliance and his practised eye selected a large meadow that would afford him a haven. Methodically, step by step, he had met the emergency. Even as he started a wide spiral to lose altitude, he was thinking of where and how he could get the half-ton of mail that rested in the compartment ahead of him to a railroad and aboard a train so that the delay would be as little as possible. Then, with breath-taking unexpectedness, it happened — and in a second the entire aspect of the situation was changed. He no longer faced an emergency that could be met coolly, methodically, step by step. Without warning, the entire nose of the plane burst into flame! The vibration of the missing motor had caused a gasoline line to break and the flame from the exhaust manifold ignited it in an instant.

His mind flashed to his parachute. Instinct told him to cast himself from the burning ship and trust himself to the silk of his chute. His hand darted to the buckle of his safety belt and his fingers closed on the cold metal. Then — they withdrew. The job was not done yet. Before he could leave the ship he must consider the mail. Safeguarding that mail was a part of the job, his duty. He owed it to himself and his job to make an effort to save it.

He realized that he had but a brief time left until he would be forced from the ship by the heat of the flames. Undoing his safety belt, he clambered out onto the trailing edge of the Northrup's low wide wing. He stood clinging to the side of the ship, while both hands grasped the cowling. Flames, whipped back by the wind created

as the ship fell out of control, wrapped themselves around him.

He reached into the cockpit with one hand and thrust the controls to one side. The ship started to slip, one wing low, and the flames were swept aside for the moment. Clinging to the edge of the cockpit with his right hand, he leaned far forward and pawed at the metal catch on the mail compartment. His gloved fingers found the catch and finally succeeded in springing it open. The cover of the mail compartment was loose.

The ship was again plunging, nose down, out of control. The flames wrapped around him, hungrily. The heat was intense, his goggles blurred, his face a rapidly mounting blister. Tears filled his eyes; his flying suit was smoldering in a dozen places. He doubted whether there was time enough to finish the job and again his mind flashed to his parachute. But the job was not done!

In desperate haste he clambered back into the shelter of the cockpit. The firewall had kept it clear of flame so far. His hands found the safety belt and strapped it around his waist. He could feel the sting of burns as the glowing edges of the charred spots on his gloves bit into the flesh of his hands. Then, as a wave of flame fiercer than ever swept back upon him and told him that the end was at hand, he made his last desperate play.

He brought the controls fiercely back into his lap and kicked strong on the right rudder as he did. The falling ship whipped out of the dive, its nose rose, then formed a pivot for the entire structure as the great monoplane rolled onto its back. The moment it reached the inverted position, Jimmie Nielson thrust the stick full forward, neutralized the rudder and held her where she was.

For full ten seconds he held the blazing ship upside down and swept across the dark night skies like a meteor. Then he released his hold on the controls, flipped the ignition switch of the motor and unfastened his safety belt. He dropped like a plummet from the inverted cockpit of the burning ship and disappeared into the night. But the mail had preceded him, falling clear from its compartment when the ship was upside down. That part of his job was done. He turned to thoughts of self. His fingers jerked the rip cord of his chute and there was a hollow "plop" above his head. An instant later, his fall was checked and he began to settle slowly down through the night, wondering how long it would take to land and where.

* * *

The next evening Bill Bowen strode into Old Pop's office. He looked him in the eye, then smiled. Reaching into an inner pocket, Bowen withdrew a bulky typewritten manuscript.

"The Spirit of the Night Air Mail is Dead!" he murmured softly. Then he tore the sheaf of paper in half and dropped it in the wastebasket.

"Well?" he questioned.

Old Pop Connors shook his head, then, with a sigh, began: "It's funny. There's no figgerin' these youngsters. Guess they have a different viewpoint. We old timers looked at the glory, the thrill of the job. They look at the efficiency with which they can perform it, priding themselves in a job well done and the heroics, if any, are incidental. But the spirit is there, Bill, it's there, and it still lives! Only," Old Pop added with a wry smile, "I guess it isn't quite as particular as it was with us old timers!"

“CHICAGO CALLING”

by Franklin M. Reck

IN a little office tucked away in the balcony of a big hangar at the Chicago airport is a man with a new job. A few years ago the job didn't exist. There was no such thing in all this world as a radio dispatcher for an air transport company — a man who sat in a small room, a radiophone to his lips, talking calmly to pilots cleaving their way through the upper air.

My search for science stories led me inevitably to this little office. But not directly. I went first to the general offices of United Air Lines in the LaSalle-Wacker Building, Chicago. United flies mail, passengers and express more than 50,000 miles a day, from New York to San Francisco and from Seattle to Los Angeles and San Diego.

“I want the story of how modern science has changed aviation,” I told the man I called upon. “High-school age fellows, today, are bugs on science, and they're especially interested in aviation. They want to be kept up-to-date.”

“I'll send you out to the airport,” he replied, “and you can talk to our managers, radio men, instrument and repair men.”

There was a feeling of exhilaration coursing through me as I left the LaSalle-Wacker Building for the trip to Cicero, where the Chicago airport is located. I went out in a taxi — the rate is 75 cents to the airline patrons. The route led south on Michigan Boulevard and west on Garfield, then south for a couple of miles to a great field, lined on its east border with hangars, repair shops, and a ticket office.

The ticket office was spacious and equipped with comfortable modernistic furniture. It was crowded with people — business men en route from New York to San Francisco; a man with a small handbag hopping over to Cleveland for a day's work; a woman and two small children going to Omaha; a mother and a babe-in-arms going East; a man with no luggage at all going to St. Louis just for the day; passengers for the Southwest.

Porters were hustling out with luggage. I glanced through the door and saw a big twin-motor idling out on the concrete apron. Onlookers were separated from the apron by a long wire fence through which, at intervals, gates opened. Uniformed ticket takers were at the gates. A big ship from the West had just landed and porters scurried out to get the luggage. I was in the Union Station of the air, the terminal point for many lines that radiated in every direction — Detroit, Milwaukee, St. Paul, Iowa City, St. Louis, Indianapolis, Cincinnati, Cleveland — all the way around the compass.

I asked directions of the ticket seller, and was sent to the United hangars and repair shops, a half mile farther north on the field. There, in the office of a wide hangar, I found the superintendent.

"You want to know what science has done to air transport?" He paused, and thought a moment. "I'll take you to the dispatcher's office. You can stay there as long as you want, and then I'll get you into the instrument and repair shops. You'll be interested in seeing how we keep in constant touch with pilots by means of the radio; how we get weather reports by teletypewriter; and how much improvement there has been in instruments."

We walked down a hallway and through a door leading

to the interior of the big hangar. The wing of a great Boeing 247D stretched gracefully above my head.

A stairway led up the left wall of the hangar. This we mounted, and then followed a railed catwalk to two balcony offices hanging just over the hangar entrance. We entered the first one and met the chief dispatcher. Here was the man with the new job created by science for the benefit of air transport.

The dispatcher sat at a desk. Earphones were clamped to his head and within reach of his hand was a radiophone that looked just like an ordinary telephone except that it had no conical mouthpiece.

The office was no bigger than 12 by 12, and most of the space was occupied by equipment. Across one wall was a big black radio cabinet with dials and knobs all over it. On another wall was a big clock connected with the Naval Observatory at Arlington.

"All pilots' watches are synchronized with that clock," he said. "In fact every station along our lines calls in and checks by it."

Below the clock was a teletypewriter, automatically clicking out weather reports. Near-by was another teletypewriter connected with Western Union, downtown. On the dispatcher's desk were report forms, partly filled out.

The dispatcher's job has grown out of two recent developments in the art of communication — the radiophone and teletypewriter. Behind both inventions are years of painstaking experiment. By means of them, he can keep at his fingertips the location of every ship in the air and the weather everywhere along the route. He handed me a report form. On it I read the following hieroglyphics:

"6-16 Trip 4 Pilot Bitterman Mate Craig Stewardess Reid On apron 1207 Flight 12:30."

"That means trip Number 4 went out of here at 12:30 today, June 16th," he explained.

Other hieroglyphics read: "1 Tl cab — 1 Washington 2 Cl 7 NY. 1 pickup Tl — NY. 1 pickup Cl — NY."

Which meant that one passenger was to be dropped at Toledo and wanted a cab; that the plane also carried one Washington, two Cleveland, and seven New York passengers. One passenger to be taken on at Toledo for New York, and one at Cleveland for New York. It was summer, the sky was fair, and the ship loaded!

"Every time a ship goes out of here," he said, "I send out a report like that to stations along the line of flight. I usually send it by radiophone, although I can teletype it. Bitterman just took off a few minutes ago. He's heading east now, and every 20 minutes I'll get a report from him."

"You mean you get a report from every United pilot every 20 minutes?" I asked unbelievingly.

"Every 10 minutes in bad weather," the dispatcher added smiling.

"Did Bitterman get a weather report before he took off?"

"The pilot always reads the weather reports before he takes off," Faulkner said. "He gets reports that cover his entire line of flight. He doesn't take any chances."

"How does the weather information come in?"

He swung around and pointed to the glass and metal enclosed teletypewriter. As it clicked along, a tape was feeding out, bearing a message from a near-by field. He lifted up the tape and let me read it. I couldn't make much out of the following:

"WT BRKN CLDS HAZY ETD 3THSD 5 E10 78
2994"

"The WT stands for Waterman, one of the emergency stations on the route," Faulkner translated. "Broken clouds, hazy, at an estimated height of 3,000 feet. Visibility 5 miles. Wind east 10 miles an hour. Temperature 78. Barometer 29.94."

And from Sterling, Illinois. "SCTD CLDS UNL 8 ESE11 80 2994," meaning: "Scattered clouds unlimited, visibility 8 miles, wind east southeast 11 miles, temperature 80, barometer 29.94."

Here's a good one. See if you can translate it. "OM DARK OVC LWR SCTD CLDS 7THSD 7SSE6 78 2987 FREQUENT THDR S TO NW."

In case you miss part of it, here it is, complete: "Omaha. Dark overcast. Lower, scattered clouds at 7,000 feet. Visibility 7 miles. Wind south southeast 6 miles. Temperature 78. Barometer 29.87. Frequent thunder south to northwest."

These code reports come in hourly, by teletypewriter, from stations along the line. From them reports are made up, and pilots, before taking off, may know exactly the weather conditions they'll encounter.

Between New York and Oakland, California, there are the 111 lighted emergency fields maintained by the Department of Commerce. A field approximately every 30 miles! And all of them sending hourly weather reports! No need for a pilot to be in doubt!

You can visualize a Department of Commerce man at Waterman, pounding out a report on a machine similar to the one in this office. As he strikes each key, that same letter strikes on Faulkner's teletypewriter. Weather in-

formation is important, and the modern air transport makes sure of instant, reliable information.

Just as I finished copying the weather codes, Faulkner turned to his radiophone. Before speaking into it, he glanced at the wall over his desk, where a queer-looking clock hung. The face divided into hours and minutes, but in place of the numerals were letters. In fact there were letters at each division of minutes.

Here was a clock that served as Faulkner's memory. The minute hand was now pointing at two letters that stood for Bitterman's eastbound ship Number 4.

Faulkner pulled the radiophone to him. There were no preliminaries. The sending set was turned on. He merely said:

"All right, Bitterman. Go ahead, Jack."

Somewhere above the earth, sitting at the controls of his trimotor, earphones clamped to his head and a mouth-piece rigged just in front of his lips, Jack Bitterman heard those words. And back to our busy little office in Cicero came the reply. Faulkner repeated it into the radiophone, for verification:

"Bitterman in four reporting to Chicago, Bitterman in four reporting to Chicago, over Harvey, 6500, 6500, on east leg Chicago beam, OK Chicago."

Bitterman was over Harvey, Illinois, flying at an altitude of 6500 feet and guided by his radio beam compass. Conditions were OK.

The dispatcher entered the information on a position report, known as a PX. He keeps a PX for every ship that leaves Chicago.

"I told you that we got weather reports by teletype-writer from stations on the route," he said. "Pilots also

report conditions as they find them. For instance Trip 3, piloted by Knight, that left here at 9:38 this morning, reported the wind southeast and variable over Maumee, Ohio. So we get all sorts of checks."

"Suppose a pilot bumps into bad weather," I suggested.
"How can you help him?"

"Well—" Faulkner leaned back in his chair. "If he reports zero-zero—"

"What does that mean?" I asked him.

"Zero visibility, zero ceiling," he explained. "That's the worst condition a pilot can meet. It means that he's flying blind through fog or rain. A United pilot isn't deeply concerned over that because he's checked for blind flying every 60 days. He knows how to keep on an even keel. What he wants most to know is what conditions he will find ahead. So I immediately get in touch with stations ahead and then call the pilot back. He decides whether to set down at the first clear field, or to go on."

"The pilot is his own master?"

"Just like the captain of a ship."

"In other words you don't want a pilot to go up—or to continue—unless he feels right about it himself."

More than once the dispatcher has brought an airplane out of a serious situation. For instance, just as one pilot circled the Newark airport—Newark is the eastern terminal of United—fog suddenly rolled in and blotted out the field. He called to the dispatcher below and asked for help.

"I'll locate another field for you," the dispatcher told him.

After a few calls, the dispatcher ordered the pilot to Hadley. The field there was clear. But when the pilot

got to Hadley, that airport, too, was hidden below fog. So he sailed back to Newark.

By this time, the ground for two hundred miles in every direction was fog-blanketed. The plane, with a cabin full of passengers, was running low on gas. Slowly it circled the field, while the Newark dispatcher phoned every conceivable place. The pilot visualized himself coasting down through that gray blanket, hoping that luck would keep him from trees and houses and telephone poles.

Finally the dispatcher found a field — not even listed on air maps — where there was a hole in the overcast through which a plane could glide. "Go down to Blank," the dispatcher told the pilot. "You'll be able to sit down there."

The pilot turned his ship south, found the hole, and landed his passengers safely. An hour later the fog had broken and he was able to go on to Newark. Before the days of the radiophone, a safe landing under such conditions would have been pure luck. Even if the dispatcher had found a field he couldn't have conveyed the fact to the pilot.

Meanwhile the Chicago operator was busy. By radiophone and teletypewriter he received three reports — one from Kylertown, Pa., announcing the departure of the westbound ship from New York, two others from Cleveland, announcing the departure of eastbound and westbound ships. There, in that little office, he knew just where each ship was, how many passengers it contained, where the passengers were going, how much mail and express were in the hold, and weather conditions all along the line. And the reports came in at the times specified by that queer-looking clock on the wall.

If you have a short wave set, you may listen in on con-

versations between airport and pilot by tuning in on the day and night wave lengths assigned to United by the Federal Radio Commission.

"The busiest time is in the afternoon with nine trips westbound from New York, two arriving from the Pacific Coast and half a dozen or more New York-bound from Chicago.

Pilots from each of these ships are reporting every 20 minutes—every 10 minutes in unfavorable weather—flight reports are going out and coming in, and stations are phoning special requests. Busy times for the dispatcher, wearing a headset, talking into a radiophone, tearing copy from the teletypewriter, and watching carefully that lettered clock!

That's the picture I carried away with me of aviation's newest job. When I left the office, a guide took me down to the repair shops. On the way we talked.

"We have two classes of pilots," he told me. "Chief pilot and mate. And they have to be experienced men. During the war any man with a thousand hours was famous. But to qualify as a mate with us a man must have at least fifteen hundred hours."

United has 120 pilots and 120 mates, flying 60 airplanes. All of the ships are Boeing 247D's, which cruise at 189 miles an hour.

And these pilots must be top-notch fliers. They're given a complete physical examination every month. They're selected for mental qualities—coolness and good judgment. Every 60 days the Department of Commerce checks them for instrument flying. They must go up in hooded cockpits and fly blind. They must, of course, have transport and radio licenses. To them night flights are as com-

monplace as day flights. In 1934 they flew three million miles at night, one third of the total mileage.

I had heard, of course, that pilots are guided on their course by radio beams — by constantly buzzing dot-dash signals that tell them unerringly when they're off course. So I asked my guide about it.

He pointed out to me one corner of the Chicago airport where two lines of antennae are strung up. Then he told me how they worked. One line, pointing east, broadcasts a dot-dash signal — the letter A in the radio code. (You know that a dot is a short buzz and a dash a long one.) The other line, pointing southeast, broadcasts a dash-dot — the letter N. These two signals, shooting out through the ether at a frequency of 350 kilocycles, constitute the beacon that guides you accurately to the airport no matter what the visibility is.

Coming into Chicago from the east, the pilot must steer a northwest course. If he's right on the line, he's midway between the A signal that's shooting off to his right and the N signal going to his left. The two signals blend into an almost continuous sound and he hears it in his earphones. He is flying in the center of a narrowing cone, toward the small end that is Chicago.

But if he goes too far to the north the A sounds louder and the other signal fainter. If he gets off his course to the south the N becomes stronger. All he has to do is correct his course until the signals blend, and he knows he's heading straight for the airport.

Perhaps you'd like to know just how a pilot follows the beacon from Chicago to New York. As he leaves Chicago he turns his dial to "64" and follows the Chicago beacon southeast. Then he turns his dial to "62" and picks up

the Goshen, Indiana, beacon. That takes him due east, and beyond Goshen he picks up the Cleveland beacon on the same dial setting. He follows the Cleveland beacon almost to the Pennsylvania state line and there he dials "39" and picks up the Bellefonte, Pa., beacon.

Going out of Bellefonte he goes slightly north of east until he picks up the Hadley, Pa., beacon, and that sends him south of east until the Newark beacon takes him to the end of his run. Through the entire trip those streams of signals, going at angles to each other, keep him on his course.

But they're more miraculous than that. Beacon signals broaden out as they get farther into the ether. As they leave the antenna they're a thin stream. Therefore, directly over the airport there's a dead spot. As soon as a pilot, following his beacon, ceases to hear the buzzes, he knows he's over the airport.

. . . There isn't room, here, to tell the whole story of modern air transport. But perhaps you've read enough to be convinced, as I was, that science is marching hand in hand with the development of aviation.



WESTBOUND MAIL

by Richard Howells Watkins

THE March wind was kicking up such a commotion on Converse Field that Don Saunders and Bill Mann were glad to crawl into the radio shack to get some quiet air into their lungs.

Chris Stepney, the operator on duty, nodded casually to

them. "What are you hanging around a flying field for on a dud day like this?" he asked. "Haven't you got homes or do you think this super-cyclone's going to die down?"

"We've been practicing looping the ship inside the hangar," Bill Mann retorted. His hands were very black, but he was happy — a sure sign that the partners' plane was hitting on every cylinder.

Don Saunders, the pilot of the combination, grinned at Bill. "In an hour the Second Assistant Postmaster General's going to give a talk over station WJJ on the air mail," he explained. "I thought I'd stick around to see if he said anything."

Chris Stepney snorted. Being in the radio business himself, he had his own ideas about anybody who listened in without getting paid for it.

"Wait here about twelve minutes and I'll let you hear another speaker on the air mail," he promised. "John Arngren's coming in from Harwick — and he's coming with a new westbound record or I'll eat my set. He's got a light ship and this wind's square on his tail."

Bill Mann groaned dismally. "I'd rather hear the Second Assistant Postmaster General than John Arngren," he declared. "That squarehead pilot with the blue eyes and slow grin looks mild enough when he comes wandering around the hangars. But if you even look sideways at him he's sitting on your chest in a second with his chart out explaining what a great air mail pilot he is."

"Well, so he is," Don Saunders asserted. "That chart of his is based on his official record and it shows that he's completed one hundred per cent of his runs in the last year."

"And he's come in on time or better, on 94.3578 per cent of his runs," Bill Mann interrupted. "I know that chart of his by heart. Every time I succeed in forgetting it Arngren comes along and tells me all over again."

"Where is he now?" Don asked.

"He passed — wait a minute!" Stepney jerked off his earphones and picked up a telephone. He called a farmhouse on the outskirts of Renfrew, a village thirty-five miles from Converse Field, near which an emergency field was located.

"Hello, Mrs. Taylor," the radio operator said, speaking into the receiver. "Heard the mail go over today? About two minutes ago? Flying high? Yes, he would with this wind. Thank you."

Stepney hung up and whistled a long note. "Arngren's traveling," he declared, making hasty figures on his blotter. "Over Renfrew two minutes ago! That's — yes! Thunder! That's averaging better than 170. He's an hour ahead of schedule. That means he's pushing his ship as well as riding this breeze."

"Murder will be done before he gets through talking about it," Bill Mann muttered. "We'd better get away from here, Don."

"What we should do is go up and escort him to the field," Don declared. "It isn't every day a Converse Field man hangs up a record like that."

Bill Mann had been aching for a test hop ever since he had finished adjusting the valve action of the motor but had refrained from suggesting one on account of the wind. Therefore, he jumped at Don's half-meant suggestion.

"I'm with you!" he declared. "If we're up when he

lands we won't have to bear the whole brunt of his conversation. Come on! The motor's still hot!"

He broke precipitately for their hangar. Don, with a nod to Stepney, followed less rapidly. He looked at his watch. It was five minutes past three. He would be back in plenty of time to hear the Postmaster General's assistant speak on the air mail service.

Together the partners rolled open the doors of the hangar. Bill Mann squinted critically at the ship as if he had never seen it before though he had been working on it most of the day.

"Wait a minute!" he said to Don Saunders. "That right tire's a bit soft. I'm going to put some air in it."

"We'd better hurry," Don reminded him. "If he's hitting a three-mile-a-minute gait he'll be slipping her in before we're off the grass. I'll be getting the dolly."

"I'm hurrying," Bill announced. "D'you think I want to be here to have him shove his chart down my throat again?"

While they worked, the telephone in the hangar tinkled. Don answered it.

"Say, Don," Chris Stepney's voice greeted him. "If Arngren was over Renfrew nine minutes ago it's sort of funny I haven't had a flash that he's passed Bennett. I just called up, but Meade, the caretaker of that field, hadn't seen him."

The radio operator's voice was rather anxious. "If he was flying very high Meade might have missed him," Don Saunders said.

"Well — I guess I won't bother Jake Converse about it unless Arngren doesn't show up inside the next six minutes," Chris Stepney said. "Jake's talking business to that Burnett biplane man."

"I wouldn't worry about Arngren yet," Don said. "He's a hard man to down. Let me know if you hear anything."

He hung up the receiver and told Bill Mann the news. On the face of it Arngren should certainly have left Bennett behind him about six minutes after he flashed over Renfrew.

"We'll take off and wait for him just over the field," Don said. "If he doesn't come — but I'm sure he will."

Don revved up the warm motor on the line. The ship was partially sheltered from the wind by the hangars. The outer ends of the wings seemed to lift a trifle now and then as a bad gust struck the ship.

Bill Mann suddenly disappeared. When he returned it was from the direction of the workshop where the parachute maintenance man had his packing table. He was wearing a seat-type parachute pack and he looked somewhat self-conscious.

"What's the matter?" Don inquired, rather curtly. "Don't you like my flying any more, or is it your waning skill as a mechanic that's bothering you?"

"Oh, I just thought I'd wear one, in case," Bill said vaguely. "You never know."

"I know this," said Don emphatically. "If you should try a chute jump on a day like this, with a surface wind of about forty miles an hour, you'd be dragged as if an express train were towing you over the roadbed."

Bill Mann climbed into the front cockpit.

"I'm wearing it for ornament and to see how uncomfortable a seat it makes," he declared.

Don Saunders did not answer him. He looked at his watch. It was now twelve minutes since Arngren had

passed Renfrew — time for him to be in sight. Don took a long look around. Arngren was not in sight. There was not a ship anywhere in the windy sky.

Don eased open the throttle. Before they were far out on the field Bill Mann was out of his cockpit and trotting along at the windward wing tip, holding the ship down in the gusts. He anchored one wing when Don turned the ship full into the wind. Then he ran to his cockpit and scrambled aboard.

Don opened the throttle as rapidly as he could without choking the motor. As the wind, in a solid sheet of pressure, swept under the wings he had a queer feeling of drifting backward. But the ship, when it did move ahead, rose into the air as if by some more subtle magic than the power of the motor. Don had never made a take-off like that before. He lost no time in going after altitude.

The air was rough, but not so boisterous as to do much more than jolt the ship. As Don held the plane's nose to the wind he looked down and saw that they were merely crawling forward. It was just like riding over a bumpy, level road in a car with the motor in low gear — there was plenty of noise and motion but not much speed.

For thirty seconds or more Don searched the air for a sight of the mail ship. He saw nothing. Bill Mann, in the forward cockpit, was looking just as keenly and as fruitlessly. Don continued to head eastward.

Bill Mann, in the forward cockpit, abruptly ceased to scan the empty air and turned to look questioningly at his pilot. Don cut the gun and leaned forward.

"Arngren is down — he must be!" he called. "How about taking a look — as far as Renfrew?"

"Right!" Bill agreed. "We've plenty — gas — and the motor's — "

He gestured toward the roaring, fullblotted motor with complacency.

Don gunned the ship and set a course that would take them over the emergency field at Bennett and on to Renfrew. He knew the country — farm land, flat enough almost as far as Bennett, and from thence on rugged and wooded. The country between Bennett and Renfrew was the sort that made the automobile tourists smile and the airman frown. It was beautiful country if you were whizzing past the forested slopes and declivities on a concrete road, and ugly country if you were flying over it and looking for a clear place to set your ship down.

Some minutes before they reached Bennett Don was down close over the fields, for the force of the head wind made hedge-hopping almost a necessity. The young pilot estimated that although there was a wind that reached forty miles an hour in gusts on the surface, there was a smooth sixty miles hitting his ship on the nose at 1500 feet.

It was, of course, risky to fly low, and it became riskier as they neared Bennett and struck out over the rougher country. But the hop that had started off as a light-hearted flight to escort a ship had now become a flight to rescue a comrade. Risks were permissible on such a mission.

Don headed directly for the small landing field at Bennett and anxiously searched the faded gray grass below him. There was no ship there. A man who stood out in the middle of the field was craning his neck up at them, but he made no sign. This man, Don guessed, was Meade,

who kept an eye on the beacon at night. Don did not circle the field; he headed steadily on his eastward course.

Somewhere in the nineteen miles of rugged scenery between Bennett and Renfrew, John Arngren and his ship had disappeared.

"He was flying high at Renfrew," Don muttered to himself. "That means that he probably got some miles beyond it; he could glide a long way in this wind even if his motor quit just out of sight of Renfrew."

Perhaps, then, he was safe in concentrating his search on the fifteen-mile stretch just beyond Bennett. He decided that he would fly as far as Renfrew and then devote himself to shuttling back and forth over the territory that seemed most likely to hold the missing plane. By this time, he knew, Jake Converse would have ships warming up to join in the hunt. The boss of the field knew that strip of bad ground even better than Don Saunders; he would understand that a pilot down there would be in real trouble. Farmhouses were as scarce as fields, there, and help would be hard to find.

Having made his plans and taken a quick glance at his gasoline gauge, Don pulled back the stick a bit, in order to get a few hundred feet of altitude under his wheels. Now that he was on the spot, lack of speed was an advantage and some altitude a necessity. You cannot see far through even leafless woodland unless you are above it. He soared up into the teeth of the gale.

While the ship bumped in the gusts and plowed steadily ahead, Don set himself to the task of flying in a straight line between the two fields. The wind, he knew, was giving him a slight northerly drift. He ruddered until his compass needle told him he was flying east by south. It

was a matter of instrument flying. The broad Transcontinental highway that passed through Bennett veered southward and did not go near Renfrew; so he had no landmark to guide him.

Satisfied with this, Don resumed his search of the ground below. But he had hardly directed his eyes to the treetops when Bill shouted and waved wildly to him. The young mechanic stabbed with his finger to the right of the ship, forward of the lower plane. Don banked instantly to get the wing out of the line of his vision. He strained his eyes ahead.

In the midst of the saplings and tangled underbrush in a cut-over section of the woods, there protruded upward the tail of a ship. In another instant Don was flying in a circle around it while he and Bill stared soberly downward.

It was the ship they sought, down not five miles from Bennett! Evidently the pilot had had enough control over his ship to dodge the taller trees and try gamely for a landing in this section of sparser and younger growth. One wing had hooked into a wild cherry that had ripped it off the ship. The motor had torn loose from the engine bearers. Looking down on the upended mail plane the partners saw all the marks of a bad crash.

Of the pilot there was no sign. Arngren might be crushed in the cockpit; he might be lying dead or unconscious somewhere in the undergrowth. Don stared till his eyes ached and he felt almost too giddy to handle the ship. Then transferring his gaze to the horizon, he devoted himself to getting back his sense of equilibrium, while his mind was busy running over the possibilities.

Suddenly he became aware that Bill Mann in his chute

harness was sitting on the edge of the forward cockpit with his legs hanging over the side.

Bill grinned at him, with his right hand gripping the ring of his rip cord. "Throttle down!" he yelled. "I'm going to go get him!"

"Don't jump!" Don shouted against the power of the gusty air. "We're too low! The wind will—"

Bill realized that he would get no assistance from Don to make a chute jump that day. He did not climb back into the cockpit. Instead, instantly, he let himself slide off the fuselage. Don saw his sprawling body below the ship for a moment. Then he was gone—whirled backward under the tail.

With a leaping heart Don swung the ship around. His eyes found his falling partner. Bill had ripped the chute pack open. The big envelope of silk was billowing forth, but he was dropping. As the parachute opened fully he hit one of the topmost branches of a tall pine.

Then the parachute, caught in the blast of thirty or forty miles of wind, jerked away. Trailing behind the chute as it sailed down-wind, Bill was dragged toward the crashed ship. His swinging body hit the top of a sapling; then he was dragged through another tree.

The chute itself then caught on the top of a tall, slender silver birch. It wrapped itself around the swaying top. Bill's body slashed downward; bounced against a thicker branch, and then dropped against the trunk of the birch. He fell a few feet further to the ground and lay in a crumpled heap, unmoving.

Don Saunders, grim-lipped, came out of his tight circle. He headed the ship toward earth near Arngren's wrecked plane. The next instant he pulled the ship out of the dive.

Where Arngren had failed, he could not hope to succeed. Impulse had injured or killed Bill Mann; it was time for Don Saunders to think, not act.

He must get down to Bill fast; but he must not kill himself; he must live to help two men now instead of one.

As he cast desperate glances about for some place to set down his ship, Don remembered the Transcontinental road. It was a wide concrete highway; there might be a chance to get down on it. If it were not too far away! He headed southwest, angling into the wind so that he would hit the road at the point nearest to the crashed ship.

A broad white band showed unexpectedly through the interlaced branches to the right of his ship. With a gasp of hope Don saw that it was the highway. Arngren, then, had probably been making for the road, but had not been able to stretch his glide far enough. If only he could get his ship down, Don thought!

As he swept over the highway Don caught a glimpse of a gasoline station — a mere shack with two red pumps in front of it. If he could land he might get help here. The road itself was quite empty of cars.

The highway, he saw, was broad enough for four automobiles but it was narrow enough for a ship. At this point it swept in a wide curve toward the southwest. That meant that he could not make a direct up-wind landing.

Grimly, after that one quick glance, Don pointed his ship downward. There were telephone poles on the windward side of the road, but on the other there were no obstacles save the treetops. There was a narrow strip of grass on each side of the concrete. That helped a little.

The ship was jumping nervously in the gale. The road, running like a slot through the woods, disturbed the even

course of the windstream. Don felt the plane lifting under him; then settling as a moment of calm succeeded a gust.

"Here goes!" he muttered. He gunned the ship to overcome the blasts of air that assailed him. Then with the control stick he raised the windward aileron slightly. The plane slipped over the treetops as the wing lowered. In another moment the ship was roaring along a course parallel with the road and just above it. Don held his wheels about ten feet over the concrete surface while he felt the strength of the air. As he had reckoned, the wind was not so fierce at this low altitude but it was full of holes. His ship dropped in one soft spot almost to the concrete.

Don gently straightened out his rudder and lowered his windward wing again. He throttled down slowly and brought his stick back. The ship was sideslipping now — sideslipping just enough to balance the wind that was drifting it off the road. If a gust got under that depressed left wing now he was through.

Suddenly the left wheel and tail skid of the ship touched. It bounced; but when the plane touched again Don's quick hand on the stick had leveled it out. The ship hit on three points this time — wheels and tail skid — and rolled on along the road.

Try as he would, Don could not prevent it from running off the concrete. The left wing tip grazed a telegraph pole; then the wheels rolled onto the soft shoulder of the road, sinking into the grass. The ship hesitated on the verge of a plunge into the shallow ditch; then stopped. The forward edge of the upper wing was not more than ten feet from the next telegraph pole.

Don leaped out, leaving the motor idling. He did not

even glance at his ship, but ran across the road and crashed into the bushes. Before he lost sight of the road he noted the direction of the shadows cast by the tree trunks and glanced at the minute hand of his watch. With this as a guide he headed through the woods almost at right angles to the road. The wrecked mail plane could not be more than a quarter of a mile from the highway. Perhaps it was less. As the trees closed in overhead, the brush underfoot became less dense. He made better time.

At the end of four minutes the woods opened up and he caught sight of smaller trees and bushes ahead. He broke through. The upraised tail of Arngren's ship met his anxious eyes. He ran that way, and sighted the parachute still fluttering from the treetop. Then he saw Bill Mann. Alive!

Bill was on his feet beside the broken remains of Arngren's plane. He was swaying uncertainly and staring at the shattered mail compartment of the ship. His leather jacket was slashed vertically in half a dozen places, as if with a knife. His face and hands were bleeding from deep scratches. But he was alive and apparently had broken no bones.

"He isn't here!" Bill wailed, when he saw Don. "He isn't here!"

Don realized that Bill was still groggy from his experience in the treetops. He looked about hastily for Arngren, who might be in worse need of help, if he were still alive after that hard crash. Bill Mann watched him dazedly, then slowly began to look, too.

"This ship's been afire!" Don exclaimed, after he had thrashed a way around the plane. "Look at that center section — and the fuselage forward there!"

Had Arngren high in the air jumped to save his life? Or had — Don stumbled over something beside the nose of the ship. It was a fire extinguisher and the plunger had been pulled out. Somebody had used it to put out the flames before the wing blazed up.

"He stuck with the ship," Don said. "Maybe —" He peered into the mail compartment. It was empty.

Just then Bill Mann called to him. The mechanic, coming out of his daze, had been making a wider circle around the plane.

"Here's the mail!" he shouted. "And there's a sort of trail here, too, Don."

Together they stared at several mail sacks that lay about fifty feet from the ship. Then Don sprinted down the trail — a dim, crooked path made by the crushing down of bushes and underbrush.

He had not gone a hundred yards when he stopped abruptly. Another mail sack confronted him. And under it, stretched out face downward on the trail, lay John Arngren, motionless, with one leg strangely askew.

While Don knelt beside the man at the end of the trail, Bill Mann came up.

"Bill!" said Don. "He's got a broken leg — maybe other things, too — but he was dragging the mail to the road!"

Bill said nothing for a moment, his head bent over John Arngren. "That's nerve!" he muttered at last.

With Bill's aid, Don got the unconscious mail pilot onto his shoulders and staggered on toward the road. Bill followed. He was dragging the sack behind him.

Fortunately Don's strength held out until he reached the service station that he had seen from the air. The sur-

prised proprietor furnished a blanket to lay John Arngren on.

"Sure, I've got a telephone," he said in answer to Don's question. "I've got a flivver, too, but you'd better just let him lie there. He's breathing all right. Don't fuss with him. I'll have a doctor here in fifteen minutes."

"Right," said Don. He turned to Bill. "How do you feel about carrying a few mailbags, Bill?"

"I guess if Arngren could drag one I can lug one," Bill said, busy over his cuts with a handkerchief.

Without another word they returned to the scattered mailbags. Fortunately, as Chris Stepney had told them, Arngren had had a light load — not more than three or four hundred pounds. They got the sacks back to the road in two trips.

"He's still unconscious," the gas station man told them. "Do you want my flivver to carry that mail?"

"No," said Don with grim earnestness. "It's going through by air."

Don led Bill to their ship. The motor was still turning over.

"I'll stand by Arngren," Bill Mann said. "Do you think you can get off?"

"I don't know," Don Saunders replied quietly, "but I'm going to try hard."

"I'm cheering for you — and John Arngren," Bill declared. He braced himself against the left wing while Don climbed into the control cockpit and gunned the ship. Slowly, as Don opened up the motor, the wheels moved forward on the soft shoulder of the road. Then the ship inclined toward the concrete as Bill held back on his wing tip with all his strength. In another moment the wheels

were on the hard surface. Together, they piled the mail sacks into the forward compartment.

"Here's hoping," said Don when the ship was loaded.

He opened the throttle wide, and taxied furiously down the road. Breathlessly, with his rudder and ailerons, he fought the tendency of the ship to head into the wind in the gusts. When he had won flying speed, and more, he eased back the stick and lifted the ship off the road. He gave her all the gas she would take—and waited. Everything would be over—one way or another—in about two-fifths of a second.

It seemed to Don that the telegraph poles on the side of the road slashed at his ship as if they were animate things. A gust got under his windward wing before he was ten feet from the ground, and threw the ship into a slip but Don, crouched over his stick, shoved it over before the other wing touched the ground. The next instant the ship regained some altitude and then, in a burst of power, surged up above the level of the wires. He had won.

As rapidly as the heavy-laden ship would climb, Don Saunders sought altitude. Then he turned. Converse Field was only twenty-one miles away—down wind. And John Arngren had been flying an hour ahead of schedule. Again he put the throttle in the last notch.

At four-forty-five that afternoon Don Saunders in the radio office at Converse Field called on the telephone the service station where John Arngren had been left.

It was Bill Mann's voice that answered the ring.

"Bill!" Don said. "If Arngren's conscious, tell him his mail made the westbound connection. Cliff Burke just pulled out with it. On time."

"Good!" Bill grunted. "He's conscious all right, but

I'm black and blue from trying to sit on his chest. He thought I was kidding him about his confounded mail having gone on. Wait a moment!"

Don, listening acutely, heard Bill shouting to someone.

"All right," said Bill, glumly, after a moment. "He believes it. He's got his chart out to show the doctor and I bet I'm next. Wonder if I can get the doc to feed him a pill? If not, I'll have to put him to sleep with my monkey wrench. G'by."

Don hung up the receiver. Chris Stepney yawned, took off his headphones to rub his ear and then looked at Don.

"Well, you missed the Second Assistant Postmaster General's talk on the air mail," he said.

"So I did," Don answered. "I forgot about that. Did he say anything?"

"No!" the radio man replied, with contempt. "Just a lot of talk about how the air mail goes through. Old stuff!"

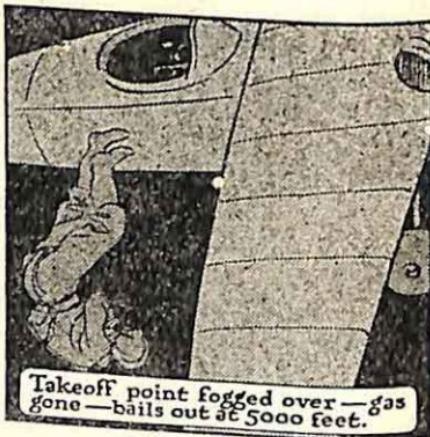
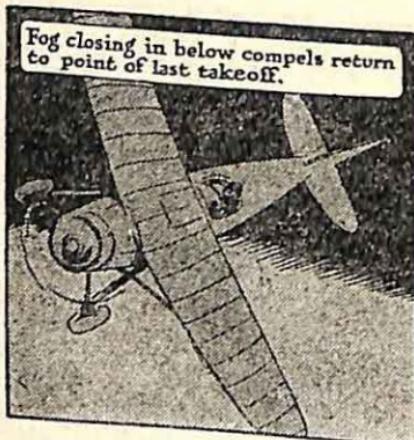
"Yeah," Don agreed. "Same old stuff." He listened a moment for the drone of Cliff Burke's receding plane, but the ship was too far away to be heard.



LINDBERGH'S PARACHUTE JUMPS

by Irving Crump

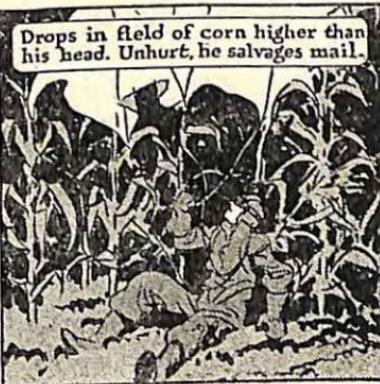
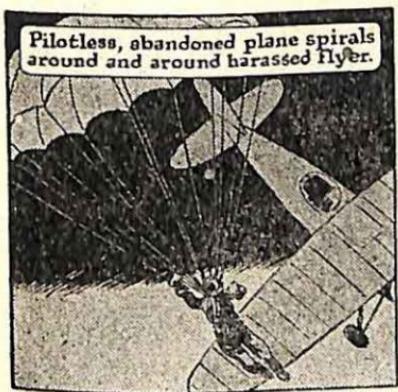
WHEN Colonel Charles Lindbergh was a captain, in the air-mail service, before his flight to Paris, he had several narrow escapes. On four different occasions he saved his life by leaping from his plane in a parachute. It happened once on a foggy night when he not only had



to save his own life, but also found it specially hard to make certain that the plane did not fall on people below.

On that evening he had left Peoria Field at ten minutes after six o'clock, having flown there from Lambert Field, and made a stop in Springfield, Illinois. The flight up to this point had been uneventful, but when he took off from Peoria, Lindbergh saw the ground haze rising before him. This fog continued to thicken, and after darkness surrounded him, barely one half hour after his take off, he found it increasingly difficult to pilot his way by the aid of lights in the towns over which he was passing. To offset this, he did the best he could to check off his position by the town lights, and then set his further course by compass.

This attempt proved absolutely fruitless, for the fog by this time had formed a solid mass between him and the ground, with its ceiling at a height of about six hundred feet. Lindbergh then was in a quandary indeed: He could not fly below this fog, for there was not enough distance between it and the earth. And although the sky was clear, to fly above the fog meant that he would simply fly aim-



lessly and perhaps be forced to drop when his supply of fuel became exhausted. That, he reasoned, was too perilous, not only for himself but for others.

Therefore, he turned about and tried to make his way back to the field at Peoria. When he reached a point which he thought was over the field, he dropped a flare to warn those on the ground that he sought a landing, but because of a fault in the release cable, the flare failed to ignite. Lindbergh nosed his ship at once for Chicago, where he hoped he might find a rift in the fog which would permit him to land in Maywood Field, Chicago's air-mail port. In his statement to the U. S. Army Air Corps News Letter Reporter, Captain Lindbergh said:

"I continued on a compass course of fifty degrees until 7:15 P.M., when I saw a dull glow on top of the fog, indicating a town below. There were several of these light patches on the fog, visible only when I was looking away from the moon, and I knew them for towns bordering on Maywood. At no time, however, was I able to locate the exact position of the field, although I understand that the

searchlights were directed upward and two gallons of gasoline burned in an endeavor to attract my attention.

"Several times I descended to the top of the fog, which by that time was eight to nine hundred feet high according to my altimeter. The sky was clear with the exception of scattered clouds, and the moon and stars were shining bright. After circling for thirty-five minutes I headed west to be sure of clearing Lake Michigan, and in an attempt to pick up one of the lights on the Trans-continental.

"After flying west for about fifteen minutes and seeing no break, I turned southwest hoping to strike the edge of the fog south of the Illinois River. My engine quit at 8:20 P.M. and I cut into the reserve gasoline supply."

It was at this point in the trip that Captain Lindbergh really had his greatest battle of wits against elements. He was only one thousand five hundred feet high, with a bank of fog midway between his plane and the earth and an engine that was becoming balky and had refused to spark correctly from the time he had loosed the reserve supply of gasoline into the main tank. The engine became worse every second, and finally the situation became so desperate that Lindbergh thought there was no more time to be lost. He was just about to quit the cockpit and release the parachute flare when the engine suddenly began to act as it should, and for the moment at least this relieved the mind of the aviator.

Captain Lindbergh whizzed on aimlessly for a few minutes more, and then examined the gasoline gauge. He found that the main tank again was dry and that he had but twenty minutes left in the air before he would drop by the force of gravity. Still he could not see through the

fog to the earth where he must seek a landing. Steadily the reserve tank was becoming exhausted, and there remained but a few minutes more before it would be as dry as the gauge now showed the main tank to be. He had to do some quick thinking. He said:

"There were few openings in the fog, and I determined to leave the ship as soon as the reserve tank was exhausted. I tried to get the mail pit open, with the idea of throwing the mail sacks out and then jumping, but I was unable to open the front buckle. I knew that the risk of fire with no gasoline was very slight, and began to climb for altitude when I saw a light on the ground for several seconds. This was the first light I had seen for nearly two hours, and as enough gasoline remained in the tanks for almost fifteen minutes' flying I descended to an altitude of twelve hundred feet. This I made in a glide to save the fuel. Once at the height I desired, I pulled the flare release cable as nearly as I could judge over the spot where I had seen the light. This time the flare functioned, but only to illuminate the top of a solid bank of fog, into which it disappeared without showing any trace of the ground."

Captain Lindbergh, flying the United States mail, now was not thinking of his own safety primarily, although naturally he did not want to die. His first thought was of innocent folk below him. He did not want to kill anyone by letting his plane drop upon a roof, nor did he want to drop upon a city street to kill pedestrians. No, their lives first, thought he; and then he looked at the gauge on the reserve tank to see how much more flying time he had. To quote the Captain himself at this point:

"Seven minutes of flying time remained in the gravity tank. Seeing the glow of a town through the fog I turned

toward the open country and nosed the machine up. At five thousand feet, the machine sputtered and died."

Captain Lindbergh realized that his life was now in his own hands. He knew that whether he lived or died, his plane was about to drop, and that nothing he could do could halt it. Why, then, should he die with the plane? Truly there was no reason for it, and rules of the air have always prescribed that an aviator about to fall should abandon his craft. Lindbergh climbed over the cockpit, his parachute ready, and his mind almost satisfied that there was no danger to anyone below. He was, it will be remembered, now at five thousand feet. His own story follows:

"I stepped on the cowling and out over the right side of the cockpit, pulling the rip cord after about a one-hundred-foot fall. The parachute, an Irving-seat service type, worked perfectly; I was falling head downward, when the risers jerked me into an upright position and the chute opened."

When he felt the weight of his body taken up by the parachute, Lindbergh settled himself as best he could, hanging for all the world like a lamb in the talons of a great eagle. He had not the slightest idea of the sort of ground he was fated to land upon. To help his vision he took his flashlight from his belt and, pointing it downward, endeavored to see the ground. But the best he could do was to place the rays on the top of the fog bank, in which there was not a break of light. The light from his bulb was merely reflected back; it could not penetrate the opaque blanket.

He had been thus engaged for perhaps a minute — and a minute in the air, suspended from a parachute, is rather

a long time — when he heard the roar of a plane. It came nearer and nearer to him. As the ship approached, it flashed through the pilot's mind that the craft was the one he had abandoned. When it nosed down, the little remaining gasoline had drained into the carburetor and had given the engine a new, small source of fuel.

Thus rejuvenated, for a short space of time, the airship began a flight of its own, and, as has happened in other instances, the plane began to harass its former master! It spiraled around Lindbergh, coming to within three hundred feet of him and forcing him several times to sideslip his chute in order to keep out of the way of the pilotless craft.

Lindbergh, in his own story later, said that the plane made not less than five distinct circuits, all of them at about the same level at which he was suspended; and when the top of the fog bank was reached and he was no longer able to see the craft, he said that it must have made several more spirals before he heard it crash. Then, he said, he breathed a sigh of relief, for one of the perils which he had suddenly been called upon to face had disappeared.

Captain Lindbergh then resumed his prospecting for a place to land, and reached for his flashlight to help him see the dangers ahead. To his dismay and chagrin, he found that the flashlight had been lost, undoubtedly when he had moved to sideslip his parachute.

There was no time for mourning over its loss; he had now to do the best he could. That best was simply to continue to fall the one thousand feet under his parachute, and as a precaution to keep his legs crossed at the ankles so that he could not meet disaster near the ground by straddling a fence or a wire. At the same time, he care-

fully shielded his face, especially his eyes, with his hands. In this most precarious and uncomfortable position he waited, and with much curiosity, for whatever was in store for him. Continuing the story himself, Captain Lindbergh told his interviewers:

"Presently I saw the outline of the ground, and a moment later I was down in a cornfield. The corn was over my head and the chute was lying across the top of the stalks. I hurriedly packed it and started down a corn row. The ground visibility was about one hundred yards. In a few minutes I came to a stubble field and some wagon tracks, which I followed to a farmyard a quarter mile away."

When he reached the yard, the pilot saw automobile headlights playing over the ground, and he thought that the plane had fallen there and that the motorists were taking a look at the wreck. This was not quite the case, however. The men in the automobile had heard the crash and were trying to determine where the ship had fallen. Lindbergh had quite a task convincing them that he was the pilot of the machine they had heard, and they were not convinced until he exhibited the parachute which he was carrying.

Farmers in the countryside had all been roused by the crash, and each thought in the beginning that the plane had landed in his own field. After searching quite thoroughly for the wreck over country covered by a three-mile radius, Lindbergh urged the party to give it up for a while until he could communicate with St. Louis by long-distance telephone. Lindbergh continued:

"I had just put calls through to both St. Louis and Chicago, when the bell rang, and we were notified that

the plane had been found in a cornfield more than two miles away. The plane was wound in a ball-like mass. It had narrowly missed one farmhouse and had hooked its left wing in a grain shock a quarter mile beyond. The ship had landed on the left wing and wheel and skidded along the ground for eighty yards, going through one fence before coming to rest in the edge of a cornfield about one hundred yards short of a barn."

Another of these parachute leaps also had to be made at night, and the circumstances were almost exactly like those of the preceding adventure, except that Lindbergh was flying snow as well as fog. Even his route and the point of the occurrence were the same. His fuel was about gone, and rather than try to land the plane upon unknown territory, he decided to jump. He took the machine up as high as fourteen thousand feet and still was in the clouds. It seemed impossible for him on that terrible night ever to find the height of those banks of swirling white.

Remembering his previous experience, he cut his switches, and stalled the engine before preparing to jump, for he did not wish to have this plane chase him around the skies. One such experience, he thought, was enough for any man. Having done this, he clambered over the cockpit, ready to leap. Then he happened to think that the wings were so fixed that they would allow the plane to chase him around and probably strike him as she spiraled toward the earth. So, regaining his balance, he got back into the cockpit, reached for the controls, righted the plane, then quickly dived over the side, at an altitude of thirteen thousand feet. As he pulled the rip cord and the chute opened, he saw his plane disappear into the mass

of cloud, much as a ship, wrecked at sea, takes its final dive into the deep.

As he slowly fell he became very cold, and the snow nearer the earth was increasingly severe. Wind currents caught the parachute and threw it here and there. Still lower, the snow turned to rain, and his parachute became so soaked that he began to fear it would no longer ride well. Nothing so troublesome happened, though, and Lindbergh began to swing his flashlight toward the ground to assist himself to land well. Even this opportunity was denied him, for the ground loomed so suddenly that he had no time to act, and he was deposited astride a barbed-wire fence in the pitch-black rainy night. His clothing, fortunately, was so thick that the barbs did not penetrate to injure his flesh, and the wire helped to break his fall.

Search finally produced the plane — an absolute wreck, its nose buried in the mud and both wings collapsed. Lindbergh left it under guard, took a train for Chicago, and returned at once with another plane to complete his mission.

WITH RADIO ANNOUNCERS

" THIS IS STATION R-A-D-I-O "

by Graham McNamee

RADIO in 1924, at least as far as broadcasting went, was still in its infancy. It was little more than an invention in the stage of experimentation. The first regular broadcasting stations, KDKA, WJZ, and ours, WEAF, had been opened but a short time before and naturally methods were rather crude. (It was not until November 15, 1926, that stations WJZ and WEAF combined to organize the National Broadcasting Company and its two coast-to-coast networks of broadcasting stations.) Station WEAF occupied two rooms in the American Telephone and Telegraph Building at 195 Broadway in New York. Today the National Broadcasting Company occupies the entire eleven-story annex of the RCA Building in Radio City, New York, and four full floors of the seventy-story RCA Building itself, with an operating staff of almost 2,000 persons.

None of the three pioneer stations I have mentioned were on the air more than four hours per day in 1924. But now the sun never sets on broadcasting — neither does the moon nor the stars for that matter. Programs in that day were very simple. They consisted of a little singing and instrumental music, reading by an author, or an occasional uplift talk by some noted clergyman.

All broadcasting (in 1924) was done through one sta-

tion. There were no "hook-ups" with other stations; whereas today when the President of the United States addresses the nation his talk is broadcast locally by two hundred or more stations. In that day our audience was limited to tens of thousands, a big one, of course, but nothing in comparison with the audience that now "listens in" over the nineteen million radio receiving sets in the United States, every one of which could (if tuned in) pick up a presidential broadcast. Nor is this the limit of a radio audience today. Many programs are also broadcast over short-wave transmission and can be heard completely around the world. The International Broadcast Office at Geneva, Switzerland, estimated that there were 48,300,000 receiving sets in the world in 1934!

Back in 1924 there were no "outside jobs" of broadcasting, such as World Series or football games, addresses from the White House, etc. Nothing reached the air but what took place in those two small rooms.

Announcing, too, was simple back in 1924. All the man before the microphone had to say was: "Miss So-and-So will now sing such-a-number," and at the end: "Miss So-and-So has just sung such-a-number," without any explanation of the music or any comment about the singer.

Everything was experimentation, with sometimes something of resulting confusion. I shall never forget my first night as an announcer. When I entered the studio, just before seven o'clock, the starting hour, I found the performers rehearsing. There were rugs, chairs, lamps and a piano, scattered about as in a living room, also a few music stands and a microphone near the piano. I saw, too, that the ceilings were padded and that the walls were

heavily draped with hangings on rods so as to reduce echoes to a minimum. I noticed one other peculiar thing. Singers were standing near the piano, awaiting the announcer's instructions, and when he spoke his voice had a curiously "dead" sound. So had the soloist's when she replied, nothing like the normal resonance of voices just outside in the reception room. It was a little dispiriting at first, particularly to one who was also a singer, and I have often heard others mention this disturbing quality of their own voices, due, of course, to the lack of resonance caused by those drapes and that ceiling padding.

John McCormack, for instance, when broadcasting his first radio concert, exclaimed: "My, oh my, this is dead! I can never sing here." And Madame Lucrezia Bori complained: "Why, I can't even hear myself, or tell what I'm doing. Does it sound that way outside?"

That's just what it didn't do, doesn't do. Echoes in broadcasting distort and blur sounds as they come through your loud-speaker. The latest improved microphones can accommodate more echo than formerly, but today such technical matters are controlled in improved ways. No longer do you see heavy fabric drapes hanging in broadcasting studios, nor ceilings that remind one of a padded cell. All this is taken care of in the construction of studio walls, ceilings and floors. Sound absorbing materials are used in construction with sliding, adjustable panels which enable us to regulate and control echoes and other acoustical problems — for the acoustical requirements for broadcasting a single voice are quite different from those for broadcasting a large orchestra, a single speaker or a riot scene in a radio drama. Even different

speaking or singing voices require individual handling on the part of our engineers. Such is the scientific development of broadcasting today.

But back in 1924, as we rehearsed we would place an artist now here, now there, perhaps within three feet of the microphone and then eight feet away. When we began broadcasting bands and orchestras we had considerable trouble in grouping a band so that the instruments could all be heard effectively and in proper balance. I noticed, too, as the announcer walked around the studio he trailed a long wire with a button on the end he held. This he pressed when he wanted the microphone "open" or "shut."

Between the two heavily draped studios I saw a glass-enclosed box like a signal tower, with faces peering out, and I wondered what this could be. Indeed, it all seemed a sort of crystal maze, and for the first few days I simply wandered about, without either direction or instruction. But soon I discovered the microphone was not at all complex, simply a little instrument of wires and springs, merely a glorified telephone transmitter. It was more sensitive, of course, for the ordinary telephone transmitter has but to catch and transmit over the wire to your telephone receiver what we call "high" and "low" sound frequencies, that is: sounds of higher and lower vibrations. A high violin tone, for example, is of "higher frequency" than the human voice, a bass tuba tone of "lower frequency." So that the ordinary telephone transmitter would not carry these tones with truthfulness or naturalness. A radio microphone has a much greater range, both upwards and downwards. In fact, the most modern microphones can "hear" higher and lower tones than the

average human ear. This is why radio sounds so much more natural than it did even a few years ago. Of course, improvements in loud-speakers have just as much to do with this. The improvement of the one has kept pace with the other.

That little glass-enclosed signal station, I discovered on investigation was just a monitor's booth. It had a loud-speaker on the table so that the engineer could hear what was going out over the air, and the windows were there so that he could see what was going on in the studio. This monitor's room was soundproofed in such a way that the engineer caught none of the conversation or instructions in the studio when the microphones were "closed." By this means he was able to correct defects of rendition that were caused by improper position of the microphone or of the performer to it.

The engineer in the monitor's booth also regulated sound volume, cutting down a blast of tone too great to be accommodated by the apparatus then in use, or "lifting" a pianissimo that was too soft to be heard through a loud-speaker. Thus the singing and speaking voices and the instrumental music came through the microphone to the engineer and from him they went over telephone wires to our transmitting station in West Street, along more wires to the roof of that building, to the aerials, whence they were launched into space from the antennae.

That is the way we broadcast back in 1924—and it's pretty much the way we broadcast today, except that we have highly improved, scientifically built apparatus, and every element is handled with that skill and knowledge which we have learned through actual experience. If you could hear a victrola record of a broadcast in 1924 and

then listen to a program coming to you through your loud-speaker you could more fully appreciate the astounding progress resulting from the conscientious, painstaking efforts of countless men — and women — who have devoted their lives and their genius to converting an invention into an elaborate art and science within a very, very few years.

The development of radio, indeed, marks one of the most amazing chapters in the development of human progress. Here is one of the most shining examples of what man can accomplish when he applies his thoughts and energies to the accomplishment of some goal.



RIDING THE NIGHT RADIO POLICE PATROL

by Edwin Teale

I AM riding on radio patrol in the heart of New York City. We are in a big gray car, listed on the police rolls as Sixty-five. It looks like a rich man's limousine, but under its soft cushions are bulletproof vests and tear-gas bombs. It carries a stubby-barreled shotgun, loaded with steel slugs, and a searchlight with a beam that reaches a quarter of a mile.

The detective in charge and his three companions are picked men who have ridden radio patrol since it was established early last year. Five square miles of teeming city life comprise the territory of our car. To the men beside me, almost every block recalls some crime in which their car has figured. In a single week, Cruiser Car Sixty-

five cleaned up five stick-ups, three burglaries, and two murders.

The steady crackle of static is coming from the loud-speaker. We catch faint broadcasts going out to radio cars in other cities. Suddenly, everything is drowned out by our radio's ear-piercing call from Manhattan's police broadcasting station WPEG: "B-e-e-e-ep! Calling cars 1007, 1005, 65. Four persons in a blue sedan with New Jersey license parked between 10th and 11th Avenues on 56th Street. Be careful. *They may have guns.* Signal 31."

The big car speeds up and the siren is thrown into action. We roar through red lights at 40 miles an hour, past staring crowds, traffic huddled at the curb. Near the end of the run, the siren stops so that the crooks will not be warned. Sixty-five slides to a stop and we jump out. Two other radio cars, small blue-green two-seaters, known to the service as "Dolly Sisters," are already there. Most of the 300 machines of the N. Y. radio fleet are such precinct cars, having smaller territories to patrol than the big cruisers.

Three men and a woman are climbing out of the blue sedan. A suspicious neighbor phoned the police when he saw them sitting in their car for an hour watching the apartment house across the street. The woman explains that they are waiting for the janitor to come home. She has a fortune in twenty American banks but can't get a dollar out and believes the janitor, whom she knew in "the old country," can help her. Just then the janitor arrives. He explains the woman is an old friend, not quite right in her mind, but harmless. The detective phones in his report and climbs back into the car shaking his head.

It is now 8 P.M. and the beeps begin to come in rapid succession. Burglars are on the roof of a store in Staten Island; an insane man with a knife is chasing his wife; there is a race riot in Harlem; a stick-up in the Ghetto. I can visualize the scene back at WPEG: the jingling telephones, the flickering dials, the announcer flipping the lever that sounds the attention note and speaking rapidly into the microphone, the dispatcher bending over the large map of the city and recording the movements of cars with round brass checkers.

"B-e-e-e-e-ep! Calling cars 1214, 1215, 65. Go to 2090 Broadway. Signal 31." The siren is screaming. We are weaving in and out of dense traffic. A motorist ahead slams on his brakes. We miss clipping him by inches. The lights are with us and we touch 60 miles an hour. Then we grind to a stop and see two precinct cars parked at the curb.

Upstairs in a beauty parlor, the chalky-faced manager is relating how he was counting the \$250 in the cash register when he had heard someone coming down the stairs from the vacant floor above, had run around to see two legs disappearing up the stairs, and had phoned for the radio cars. For the next 15 minutes the detectives comb the upper floor and the roof. Apparently the frightened thief has scuttled down the fire escape. But even when a crook gets away, the speed with which the radio cars swoop down on the spot he has just left makes him pause before taking another chance, and thus is deterrent of crime.

A little after midnight, I see another nerve-tingling phase of the patrol work — stopping suspicious cars and searching them for guns. A car with six men in it and its motor running stands at the curb in front of an all-

night restaurant. "They don't look so good. Let's give them a toss," is suggested. Sixty-five slides noiselessly abreast of the other car and then cuts in at a sharp angle ahead of it. Tinkling against our windshield is a metal plate labeled POLICE to keep the detectives from being mistaken for bandits. Before the wheels of Sixty-five have stopped rolling, our men are surrounding the other car. They search the occupants, look under the seats and even lift the hood. Since the start of the patrol, the crew of Sixty-five have taken 18 guns. Only a few nights before, they got five at once when they stopped a car and found four men with a record of 23 stick-ups.

As we are heading uptown, in the early morning hours, comes: "B-e-e-e-e-ep! Calling cars 1206, 1207, 65. Yellow roadster stolen at garage at 401 Ninth Avenue. SIGNAL THIRTY." Code Signal 30, the "dynamite call," indicates a major crime. We are only a few blocks away. Two men had shoved automatics into the stomach of the Negro washer in charge at the garage and had sped south in a car just left by a customer. Only 30 seconds have elapsed since the information was phoned in, yet already every machine on the radio patrol has been warned to keep a sharp lookout for this roadster. "We'll hear from that baby before the night's over," predicts our driver as he jerks Sixty-five around in pursuit. Almost every big holdup nowadays is preceded by an auto theft to provide for the getaway.

Dashing down the avenue, we see far ahead a car flickering in and out of the street lights, clearly traveling at a high speed. Elevated pillars, black and white, are streaming by. Everything is deathly still inside our car. The speedometer hand is rising higher and higher. The tiny

red dot of the other car's tail-light is slowly growing larger. Now we can see it is a light-colored roadster. Two blocks away, we suddenly catch a glimpse of a trolley bumping its way across town directly in our path. On the slippery car rails we cannot stop. Hemmed in by the steel pillars we cannot swerve to either side. Our siren is screaming, but only when the nose of the trolley has actually poked past the line of pillars does the motorman hear it and slam on his brakes as we streak by.

At every block now the car ahead is gaining in size. Around me the men are leaning forward, hands on the doors, ready to jump. Suddenly the roadster slows down and swerves into a side street. Two black streaks shoot from the car into the weeds of a vacant lot. Cornered, the bandits are getting rid of their automatics. A moment later their machine tries to make another turn at high speed, careens on two wheels, and crashes into a wall.

A short man in a gray coat leaps from behind the wheel and races for an alley. The men are tumbling out of Sixty-five, guns in hand. A roared "STOP!" carries for two blocks. The running man flashes back a look over his shoulder and stops, hands in the air. The game is up. His companion, knocked out by the crash, is coming to. From the loud-speaker comes a calm voice: "The time is 2:01 A.M."

. . . Later, shaking hands with me at the end of the tour, my host remarked a little apologetically: "Well, I'm afraid it's been a pretty tame night."



WITH HUNTERS AND EXPLORERS

HUNTING ELEPHANTS FOR MUSEUM SPECIMENS

by Carl and Mary Akeley

THE elephant always may be trusted to provide the hunter with plenty of excitement. His great size, colossal strength and magnificent courage are qualities that make him stand out as one of the most interesting as well as one of the most dangerous of beasts. Often he appears when least expected and frequently does the totally unexpected. Walking unprepared into his presence is like stepping out of a quiet home into No Man's Land — it may be perfectly safe but the odds are considerably against it.

One day in Uganda we followed the trail of two old bull elephants for five hours. We were in a big feeding ground and the elephant tracks crossed, intermingled and circled in a bewildering maze. I had told Bill, my faithful Kikuyu gun bearer, to follow the trail, more to test his ability than in the hope that he would succeed in bringing me to the herd. But I underrated Bill. Suddenly the boy stopped short and held up his cane as a signal for caution. Not more than twenty feet from us stood the two old bulls. They had not heard our approach nor had they caught our scent, but as I studied them from the shelter of a dense bush I realized that we were in a very dangerous position.

I had no desire to kill an elephant, except one for my museum group — and that meant only an unusually fine

specimen; but I had even less desire to be killed by an elephant. So, with two of them as close to me as if we had been in the same room, and with nothing between us but a flimsy screen of bushes, I could take no chances. I hesitated, trying to convince myself that the tusks were fine enough to justify a shot. Then, without warning, my decision was made for me. A great gray trunk was thrust inquiringly forward — forward until it nearly touched my gun barrel. The movement may have been an attempt to catch my scent. I do not know. I had one glimpse of angry eyes set in a solid wall-like head — and I fired. The animal, wounded in the neck, swung around and bolted. I could not watch him nor gauge the effect of my shot, as his companion was right in front of me. He paused for a moment; then, apparently familiar with the deadly language of the rifle, he made a quick retreat.

Bill and I followed for about a hundred yards. The wounded bull scented us, turned and charged. I took aim, but there was no need to press the trigger, for the giant had made his last stand. His column-like legs swayed, crumpled beneath his weight, and the tremendous body lay outstretched on the ground. My bullet had pierced the jugular vein — a quick death. It had been a chance shot but, fired from such a short distance, it was much more effective than such shots usually are.

I had luck that day. Not, however, until some years later, when I talked with other hunters in Nairobi, did I realize how good my luck really was. I talked with men there who had had experiences similar to my own but who had not had my good fortune in escaping without injury. Great hunters who had been tossed and trampled — and lived to tell the tale.

Outram by keeping cool in a great emergency saved himself from a most unpleasant death. He had shot an elephant and the beast had fallen. Believing it finished, Outram approached. "Suddenly," he said, "to my surprise and horror the *dead* elephant rose and rushed at me. He caught me with his trunk and I went spinning through the air. I don't know whether in that brief flight I thought at all, but by the time I landed rather hard in the grass, amazement had given way to fear and I was sure that something had to be done and done quickly.

"I could see the elephant coming after me to trample me into the ground. Fortunately he paused for a second to crush my helmet, which had fallen off during the attack. That second saved me. I got under the beast's tail and there I clung while he wheeled and circled in a vicious attempt to get me in reach of trunk or tusks or feet. After a few moments of this sport, my injuries began to tell on me. The unequal contest could not have lasted much longer. Fortunately at the crucial moment my companion arrived and killed the elephant."

Hutchinson's story was similar to Outram's. An elephant caught him in the same way, wiped up the ground with him and then threw him into the trampled vegetation; but he had presence of mind enough to mix himself up in the animal's legs until his gun boy could fire.

The angry beast that caught Alan Black more nearly carried his charge to a finish. The method of attack was the same; but when the elephant discarded him, Black landed in a bush that broke his fall. The elephant followed and stepped on him, returning two or three times to step on him again, but the bush into which Black had fallen served as a cushion and saved his life.

The elephant's trunk is the most remarkable organ any animal possesses. The arm of a man is notable because it may be swung about at any angle from the shoulder, but the elephant's trunk may be twisted and turned in any direction and at any point in its entire length. It is just as powerful in one position as in another. It is without bone — a great flexible cable of muscles and sinew, so tough that the sharpest knife will scarcely cut it. It is so delicate that the elephant may pluck the tenderest blade of grass, yet so strong that he may lift a tree weighing a ton and toss it about easily. With his great height and short, thick neck, the elephant would find it difficult indeed to feed if it were not for his trunk. However it enables him to secure the choicest morsels on the ground or in the tree-tops and to strip a whole forest of bark and branches, if he feels like it. With his trunk he has a most extraordinary ability to detect the faintest scent and to punish or kill an enemy.

I had been on a collecting expedition for the museum, and had obtained all the necessary specimens, when an old bull who tried the quiet waiting game "got" me. Descending from the ice fields of Mount Kenya, that snow-capped peak on the equator, we had made a temporary camp, intending to rest until our base camp could be portered to us. The interlude gave me an opportunity to make some pictures of the typical elephant country all about us. With a party of fifteen, including gun boys and a few porters, I went back up the mountains to an elevation of nine thousand feet at the edge of the dense bamboo forest.

Probably all would have gone well, and I might have obtained some valuable photographs, had we not run across the spoor of three large bulls. It was an old trail

and I knew it would take time to follow it, but the tracks were so unusual in size that I could not resist the temptation. There was always the chance that the trail might be crossed by a fresher one made as the bulls circled about feeding, but instead it led us on from noon until sundown without bringing us to any new sign.

The night on the mountain was so bitterly cold that we were glad to be up and on the move again at daybreak. There was frost in the air and the morning was still misty when we entered a great elephant feeding ground. It was an open space where the rank growth attained eight or ten feet in height and where the animals milled about eating the vegetation and trampling it down until there was very little left. The place itself was a labyrinth of trails, and from it, as the spokes of a wheel radiate from a hub, were the clear and definite tracks of the departing elephants. Soon after we left this feeding ground I came upon the fresh tracks of my three old bulls, so fresh that they must have been in that very spot an hour before.

But the network of paths led nowhere. For some time we wandered about in an attempt to follow the elephants; then, growing impatient, I left the clearing, intending to circle about it in the hope of finding on its outskirts the trail which the tuskers had taken. I had gone but a short distance when I found more fresh tracks. I stopped to examine them, and, as I did so, the crackling of bamboo not two hundred yards ahead caught my attention. The bulls were almost within rifle shot and were giving me the signal for the final stalk.

I waited while one of my trackers ran silently along the trail to a point about fifty yards away where it made an abrupt turn. He indicated the direction the animals had

they had dispatched a messenger asking for help. At that rate, assistance should have been close at hand. Fearing that the rescue party was lost on the mountain, I ordered my heavy gun to be fired every fifteen minutes, and within an hour my boys heard an answering shot from a smaller rifle.

When relief arrived I was a sorry-looking spectacle. The blow from the elephant's trunk which had stunned me had also skinned my forehead, blackened and closed an eye, broken my nose and torn open one cheek so that my teeth were exposed. Several of my ribs were broken and my lungs were punctured. I was covered with mud and splashed with blood. But apparently it was my face that was the awful sight.

Just why I was not crushed completely, I shall never know. Beneath the old bull's weight, or even under the pressure of his enormous trunk, my body would have offered about as much resistance as a soda cracker. My only explanation — and I think it is the correct one — is that a root or rock under the surface of the ground must have stopped his tusks, and that seeing me unconscious he must have thought he had killed me. He had then left me and had charged about the clearing after the black boys.

My experience is just one more illustration of my idea that a combat between a man and an elephant is still a fairly equal contest. Even the express rifles of the twentieth century have not given the hunter an overwhelming advantage over this mighty beast . . .

. . . Man has not played this elephant hunting game for centuries without learning at least its elements. There are many white hunters in Africa who have gained great knowledge of elephants, and it was with one of these pro-

fessionals, Cunningham, that I did my first tracking. He was a real hunter, and he taught me everything that one man can teach another about the game; but even so it did not take me long to discover that my schooling had only begun. Most of the essentials in hunting an animal as intelligent as the elephant belong in the list of things that can be learned only by experience. He who can understand the elephant well enough to guess his next move—and then forestall it—will stand the best chance of success.

Moreover, there is much to learn about an elephant in addition to the best method of killing him; and learning it gives one many a thrill. An elephant alive is vastly more interesting than an elephant dead, and my object in going into Africa was not primarily to kill, but to make acquaintance—as intimate acquaintance as possible with the live, wild elephant in his jungle home. I have studied Tembo for months at a time under every possible condition; on the plains, in the forests, on the mountain sides, even above ten thousand feet—and I have reached the conclusion that the professional hunter has missed half the excitement of the game—half the sport. I firmly believe that of all the wild animals on this earth today, the African elephant is the most fascinating and the most difficult to understand.

The student of animal nature must know how to handle his elephant gun. Frequently when he least expects it he is forced to use it. The great expanse of hide of an African elephant would seem to make him as easy a mark as the proverbial barn door. But as a matter of fact there are only three vulnerable points in all his huge body. You can kill if you can hit an elephant's backbone and sever

taken. Then I turned my attention to the porters, watching them select a place to lay down their loads in a clump of trees where they would be somewhat protected in case of a stampede. The second gun boy presented his rifle for inspection. I examined it, found everything in order, and sent the boy to a safe distance with the porters. The first gun boy presented his gun; I took it, handing him the rifle I had already examined. The second gun was now ready. I leaned it against my body and stood, my back to the wall of the forest, blowing upon my hands numbed by the cold and chafing them in order to have at a moment's notice a supple trigger finger. At the same time the first gun boy was taking the cartridges from his bandolier and holding them up so that I could be sure that each was a full steel-jacketed bullet — the only kind that will penetrate an elephant's head. There was no reason to suppose that the animals suspected our presence, and I prepared for the stalk with my customary caution and with more than my usual deliberation.

I was standing with my gun leaning against my hip, still warming my hands and still looking at the cartridges one after another. In a flash, one of the calmest moments of my hunting experience changed to the most profoundly intense moment of my entire life. I suddenly knew that an elephant was right behind me. Something must have warned me, but I have no idea what it was. I grabbed my gun, and as I wheeled around I tried to shove the safety catch forward. It would not budge. I wanted desperately to look at it, but there was no time. I remember thinking that I must pull the trigger hard enough to fire. Then something struck me a staggering blow. I saw the point of a tusk right at my chest. In-

stinctively I seized it in my left hand, reached out for the other tusk with my right, and went to the ground between them as the great body bore down upon me. One merciless little eye gleamed savagely above me as the elephant drove his tusks into the ground on either side of me, his rolled-up trunk against my chest. I heard a wheezy grunt as the great bull plunged forward, and I realized vaguely that I was being crushed beneath him. Then the light went out.

It was evening before I recovered consciousness, in a dazed sort of way. I was dimly aware of seeing a fire. I was lying where the old bull had left me, in a cold mountain rain, while my superstitious black boys, believing that I was dead, refused to touch me. I tried to shout, and I must have succeeded after a fashion, for a little later I felt myself being carried away by my legs and shoulders.

Later I had another lucid interval, in which I realized that I was in one of the porters' tents. Then I tried to piece together the events that had led to my accident. I supposed that my back was broken because I could not move. I felt no pain. I was miserably cold and numb, and that reminded me of a bottle of brandy, carried for emergencies. I ordered the boys to bring it to me and pour it down my throat. I also had them prepare for me some hot bovril, and gradually the numbness left me. Then I discovered that I could move my arm a little. I tried the same experiment with my leg and was successful. Though the effort brought pain, it told me that I had at least a chance for recovery.

When morning came, my mind was clear enough to inquire for my white companions at the camp below, and the boys told me that soon after the elephant knelt on me

the spinal cord. You can kill by hitting his brain or his heart. A bullet anywhere else probably will not hurt him much; at least, not immediately. But the brain and heart shots are the only safe bets. I say "safe" a bit doubtfully, for the brain is armored by an amazingly thick skull, and the heart in silhouette would cover only an approximate square foot of area; and, besides, it requires a good knowledge of elephant anatomy to locate it in the huge frame.

It might not be so difficult to place a shot in one of those three assailable spots if elephants were not so clever at playing hide-and-seek. Elephants in the jungle do not exhibit themselves from trunk to tail as they do in the circus. You are lucky if you realize that the little patch of gray hide showing through the foliage is not a section of granite boulder, and if you can distinguish an old cow's motionless trunk from the surrounding trees.

The elephant is so nearly the color of the shadows and the tree trunks and the boulders that he may be as invisible as a cotton-tail rabbit in a hedgerow. The point of a glistening tusk, a sparkling, wicked little eye, or the tip of a great scalloped ear, is not camouflaged as successfully as the trunk or a patch of hide; but even with such a starting point it is a picture puzzle. It will give you more serious thought than entertainment to figure out just how the beast is standing and where one should aim among the bushes to strike heart or brain. Failure to select a vital point may be fatal to the hunter.

A bullet from an express gun which hits an elephant in the head will not invariably stop and turn him. One time when I was coming down through Uganda I crossed the tracks of a herd of elephants. As we were down wind

from them and as it was about noon, the quietest hour of the day, the chances appeared good for overtaking them with ease. It seemed an excellent opportunity to look them over and perhaps to find the big bull I needed for my museum group. Just as I expected, we approached unnoticed to within twenty-five yards. We examined them leisurely through the glasses, as they gathered in the shade for their usual siesta. I have never seen African elephants lie down. They come together to rest, mill lazily about under the trees, and only occasionally change position. We studied the slowly shifting herd, taking our time for it and finding it almost as difficult to select a particular elephant from the mass as to distinguish his outline behind a screen of shrubbery.

At last we picked out what seemed to us an exceptionally fine bull. One of the party took deliberate aim and fired. The elephant dropped, apparently dead. We could not rush in for the customary finishing shot, for, instead of making off with all speed as is usually the case, the herd lingered. To our great surprise when his companions finally got under way the bull struggled to his feet and continued after them. A volley of bullets from our guns appeared only to speed his departure.

We followed the elephant, taking his own trail because the vegetation was too dense to travel silently in any other way. We had been going for some time, hoping to reach a space sufficiently open for us to leave the trail and come alongside for a more effective shot. Suddenly I began to realize that the trail had been slowly turning so that the wind was from us to the injured bull. Hastily we moved out to the side, but we were too late. The bull already had our wind. I knew he had it, although I could not see

EXPLORING ON THE ISLAND OF BORNEO FOR THE MUSEUM OF NATURAL HISTORY

by Roy Chapman Andrews

I RETURNED from the St. Lawrence River at the end of June, 1909. A month later the Director of the Museum called me to his office.

"Would you like to go to Borneo and the Dutch East Indies?" he asked. Just like that! Would I like to go to Borneo?

"Can a duck swim?" said I. Probably I did not use exactly those words, but whatever I did say got my idea across emphatically. It was ridiculous to ask me if I wanted to go anywhere. I wanted to go *everywhere*. I would have started on a day's notice for the North Pole or the South, to the jungle or the desert. It made not the slightest difference to me. I was young, without a care or responsibility in the world, and keen for the adventure of life. Already it had begun to be such an adventure as I never had dreamed of. So it has been ever since.

The Director went on to explain. "The U. S. Bureau of Fisheries have asked if I would loan you to go on a cruise of the exploring ship Albatross. They want to investigate the small islands of the East Indies and to do deep-sea dredging. Your job will be to study the porpoises. Doubtless there are many new species to be discovered. No one has done it. Also you are to collect mammals and birds wherever possible."

It was all very plain and matter-of-fact to him, but not to me. The Albatross was the most famous deep-sea exploring ship of her time. Mere mention of the name

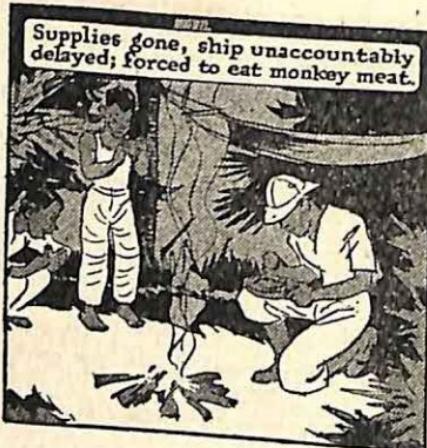
brought visions of strange new lands, of thrilling adventures, of Robinson Crusoe islands!

I went back to the Sigma Chi fraternity house at Columbia University where I was living, literally walking in a dream. A fortnight later the dream was translated into reality for I was actually on the way to Seattle. There I got a ship for Japan. Dozens of girls swarmed on the deck before we left. I remember how disappointed I was when all the pretty ones got off leaving only six or seven who were very hard on the eyes. They were going to a mission station in Korea.

Japan was all I hoped it would be and that is saying much. Fujiyama smiled at us above the clouds as we steamed into the sun-lit bay at Yokohama. The Japanese say that if you see Fuji when you first come to Japan you will return many times. Certainly in my case it has proved true. The strange new life, the babel of a foreign tongue, the costumes and the colors thrilled me mightily. Now, much of it has vanished. Motorcars and trams replace the swarming rickshas; European dress is driving out the graceful kimono.

We pitched and rolled our way across the China Sea in the tail end of a typhoon. Out there is where the typhoons hatch. When one has grown sufficiently to start life for itself, it sweeps across the water toward Hongkong, up past Formosa and Japan and out to sea. They are terrifying storms. A deluge of rain and furious wind which whirls and twists along like a tortured devil. I have weathered three; one on shore and two at sea. I don't mind telling you that three are more than enough.

Manila pleased me as much as Japan and China had done. The modern city of today was then just coming

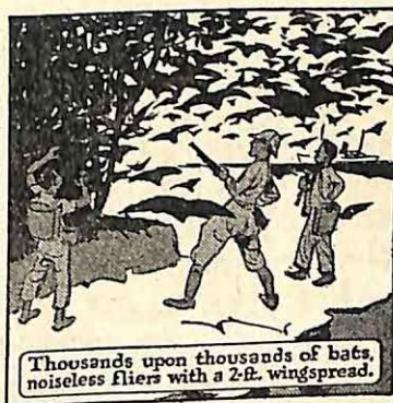


into being. The hotel was the old Metropole at the end of Santa Cruz bridge. The Army and Navy Club occupied a picturesque Spanish house in the walled city; the moat was still a slime-filled ditch.

I was to join the Albatross at the Cavite Navy Yard. She was south near Zamboanga, and would not return for several weeks. The late Dean C. Worcester, Secretary of the Interior for the Island government, was a naturalist of repute. When he learned that I was from the American Museum of Natural History, he said, "I'll do anything I can to help you."

That meant a good deal, for Worcester was the big man of the Islands. I wanted to get busy at once, and he virtually turned over to me one of the little government steamers. He told me of a small island which he had long been wanting to explore. It was off the usual track of coastal vessels. The ship could drop me there and pick me up when it returned.

A week later on a glorious tropical morning I was rowed with two Filipino boys toward the low shores of a palm-clothed island. Water blue as indigo covered the



outlying coral reef over which floated fishes painted in rainbow colors. We landed in a sandy cove and made a rapid exploration of the island. It was uninhabited but had a spring of good water; that was the important thing. After leaving food for five days and our collecting gear, the ship steamed away. I was a Robinson Crusoe with two men Fridays.

For a week I had a glorious time exploring the island, trapping small mammals and collecting birds. At night we slept in canvas sea hammocks swung between palm trees to keep away from ants and land crabs.

But the ship did not return at the appointed time. Neither did she come the following day, nor the next. Our food was gone and almost all my ammunition. Still we were doing well enough. There was one family of monkeys on the island — a mother and father and two babies. We ate them at the end of the first week, but I saved one in alcohol as a specimen. Monkey is not bad — if you are hungry enough! Nevertheless, you could put me in the monkey house at the zoo without the slightest danger to the inmates.

When ten days had passed and no ship, the Filipino boys decided that they were going to die and the sooner it was over the better. I verily believe that they would have given up and starved to death. But I had not the slightest intention of dying. As a matter of fact I was having a bully time for I knew that eventually Secretary Worcester would send a boat. All we had to do was to keep alive until he did. Before the last shotgun shell had killed its last bird, I made the natives get busy. Thousands of beautiful white pigeons with black wings and tails came to roost in the trees. There were plenty of fish on the reef. All we needed to get them both was a net. The boys made a net out of rattan and palm fiber. I evaporated sea water for salt and we had the necessities of life — salt, fish and birds. There was plenty to do for we could still trap small mammals. I remember thinking that I ought to have all the appropriate feelings of despair at being thus abandoned but for the life of me I could not work up anything of the sort. The ship was gone two weeks. She had had propeller trouble and the captain was terribly worried about us. When he found how comfortable and happy we had been he became equally disgusted.

Eventually the Albatross arrived at Cavite and I met my shipmates. She was manned by the Navy and carried about twelve officers and sixty men. Also there were three naturalists besides myself and a Japanese artist who painted fish. Almost immediately the ship left for Borneo. We stopped for a short time at the village of Tawao, British North Borneo, and then proceeded to Sibitik Island. Here the ship waited while I went inland to shoot. My first impression of a Borneo forest was one of sound rather than sight. Myriads of singing insects filled the air

with such a medley of shrill vibrations that my eardrums ached. I prayed for just a moment of silence. But silence did not come until after the daily deluge of rain at half-past four. There were sights enough too for it was just as I had imagined a Borneo jungle ought to be. An impenetrable wall of giant trees stretched up and up seemingly almost to the clouds. The white camphor wood and *kayu rajah* or "king tree," more than two hundred feet tall, dominated all the rest. Each was hung with a tangled network of vines and creepers; below, palms and banana trees grew thickly between the larger trunks.

I soon found that it was impossible to move in the forest except by cutting a path with a huge native knife, machete. I tried to break through an opening but in two minutes was caught in a dozen places. Three-inch palm thorns had me by the trousers and spiny "wait-a-bit" vines laced across my chest and back. I lost my temper and tried to back out, but I tried just once! The more I pulled the deeper went the thorns. Every move was agony. Finally, Miranda, my native boy, cut me loose. My clothes were in rags and I was streaming with blood.

Miranda looked at me and grinned. "Master better learn not get angry. No use. Better use knife," said he.

He was right. The jungle is no place for an impatient man. When I got back to the ship that night my feet were sloshing in the high boots at every step. I thought it was water and was horrified to pour out pints of blood. At least a dozen leeches had worked their way through the eyelets and into the top of each boot. My legs were covered with tiny red spots from which the blood oozed in a thin stream. The wretched leech deposits a serum wherever he takes hold which prevents the blood from

coagulating. The wound keeps open, is sure to become infected and then you have a nice mess. There is just one way to beat his game. Wear high shoes with the tongue sewed in and spiral woolen puttees. The leeches can't work through the wool folds if they have been properly wrapped.

I set a line of sixty traps for small mammals. The next morning every one was sprung and I had only one mouse. He was but little more than a skeleton for the ants had found him before I did. I could not imagine what had sprung the traps until I saw some huge ants, an inch in length, playing about one of them. That gave me an idea. I baited a trap, set the trigger lightly and made myself comfortable to watch. In a few moments a huge ant climbed on the pedal and began pulling at the bait. Then two others joined him. In five minutes they had sprung the trap.

Land crabs, noisome creatures which will devour a man if he is helpless, were as bad as the ants. Between these two pests, the collecting of small mammals was very poor, but with larger things I was more successful. Proboscis monkeys were fairly abundant. They are huge brown fellows with long bare finger-like snouts. It was not easy to shoot them for they could travel at full speed through the jungle, swinging from one tree to another, while I had to cut my way slowly along the ground. Finally one herd stopped to feed in a grove of bananas and I shot three before they discovered where the bullets were coming from.

Once I had what might be called a real adventure with a huge python. There are many snakes in the jungle but one seldom sees them for the cover is so thick that they can glide away unobserved. I do not believe that I actu-

ally saw more than half a dozen during as many months. The python incident would have been horribly fatal except for Miranda, my native boy. We were walking along a narrow animal trail in the jungle. I was ahead and going slowly. Suddenly, I felt myself jerked violently backwards and heard Miranda's excited voice.

"Excuse, Master, but big snake right there. You shoot him quick."

He pointed to a thick branch overhanging the trail. Try as I would I could see nothing except a gray tree trunk. Miranda was frantic. "There, there, don't you see him?"

I did not. Then the breeze moved the leaves a bit and a patch of sunlight fell squarely upon a glittering eye in a dark flat head. Following it back, what I thought was a tree trunk resolved itself into the vast bulk of a python lying close along a low overhanging branch. Perhaps ten feet of the body showed behind the head; the remainder was lost in the thick shadows of the tree.

I backed thirty feet away, lined my sights on that glittery eye and fired. A cyclone seemed to have struck the jungle. I caught a glimpse of yards and yards of snake, writhing, twisting, slashing. Vines and creepers were torn, small trees shattered. Miranda and I ran, for it seemed that anything might happen. It must have been half an hour before the jungle was quiet again and we dared to slip back to where the eruption had taken place. The snake was there all right, its enormous body twisted into folds and knots. My bullet had smashed the head to pulp. We straightened the reptile out as best we could and I paced the length. It was pretty close to twenty feet.

Without doubt Miranda's sharp eyes had saved me from a rather horrible death. The python had been lying on

the low branch watching the trail. If a wild boar or deer had stepped along the path, fold after fold of the huge body would have been thrown about the beast and its life crushed out. Probably I would have met the same fate. After all, a python is no respecter of persons and anything that moves and breathes and has flesh would be grist for its mill. I could almost feel my bones being crushed as I watched the still-twitching muscles knot themselves tighter in the throes of death. We were so far from the ship that it was hopeless to skin the reptile, so we left it as it lay. I did not like to do that even to a snake, for I never have killed except for food or specimens. I have shot during my entire life. It has been part of my job. Many thousands of birds and animals have fallen to my gun but for every one there was a real cause. I find no pleasure in killing just to try my skill. Now, after many years, it has become distasteful to shoot even for food. Dangerous animals are somewhat different. If you give them an even chance they can strike back.

On the way back to the beach I thought I heard an airplane. I was perfectly convinced of it, but nothing was visible in the sky except a great bird far above the trees. Down it sailed and I realized that this was the airplane. The top of a huge camphorwood tree bent under the weight as it alighted on the thin branches. The shotgun was useless at that height but a steel bullet from my rifle brought it crashing down. It was a hornbill — the first I had ever seen alive. After looking at the stiff quills of the wing feathers, I realized that they had made the hum I had mistaken for a distant airplane.

Parrots were everywhere. One island which we visited simply swarmed with them. I collected eleven different

species and almost every officer and bluejacket on the ship purchased one for a pet. The vessel became a floating aviary and the noise was nerve-racking. Most of them had been taught Malay but they learned English quickly enough. Finally a big white cockatoo belonging to one of the officers jumped down a skylight into the captain's cabin and nearly wrecked the place. An edict was issued against all parrots. The sailors were furious but my collection of bird skins grew correspondingly.

One day in the late afternoon we dropped anchor off a tiny, heavily forested coral island. I went in with two natives to have a look at the place. From the edge of the jungle I saw half a dozen low trees which seemed to bear strange black fruit. It hung in masses from every branch and actually was in motion. I thought I had the "heebie-jeebies" and stepped up very gingerly toward the nearest tree, squinting my eyes against the sun.

Bats. They were not fruit but fruit-bats. Farther back in the shadows the jungle was alive with them. Thousands upon thousands hanging head downward like huge black pears. They were just beginning to awake after their day-long sleep and were quarreling and murmuring, probably discussing their dreams, or whatever bats talk about. When the breeze swept out from the depths of the jungle it brought a sweetish musty odor, almost overpowering.

At last I fired at a cluster hanging right over the beach. Both barrels, one after the other into that black squirming mass. Then there *was* a row. A pandemonium of shrill squeaks and the whole jungle seemed to belch bats. Fifty thousand, a hundred thousand, I couldn't even estimate. There might have been a million for all I knew. The sky

was black with them. Each had a wingspread of more than two feet but there was a strange absence of noise. Nothing like a roar of wings such as birds would make. Just a strange swish when they went by. They fluttered up like a cloud of wind-blown leaves, drifted over the ship and disintegrated into thousands of black flapping entities. It was a weird sight; there was something ghastly and unhealthy about it that made me shiver. Like a breath of damp stale air from the blackness of a dungeon.

It is strange that bats should affect Occidentals that way. Chinese consider them to be omens of fortune. It is one of their good-luck signs. You will often see it used in the decorations of rugs and embroideries. Bats and clouds! These big fellows are not like the bloodsucking vampires of South America; they feed almost entirely upon fruit. What tons they must destroy!

The strange birds and mammals gave me a wonderful time on land but with porpoises it was not so good. We saw only two or three schools and they did not seem to like us. According to theory, they ought to have played about the bows of the ship and given a continuous acrobatic performance. I have seen them do it sometimes but those we found were not properly trained. They left us severely alone and even when I went out in a small boat we never got near enough to shoot or use the harpoon. Still, I didn't mind much. There were quite enough other things to keep me busy every second.



If you like this adventure you should read *Ends of the Earth* by Roy Chapman Andrews.

WANTED: A LIVE ELEPHANT FOR AN AMERICAN PLAYGROUND

by Frank Buck

IN my business a tame-sounding order often makes the most trouble. When Herbert Fleishhacker, well-known banker and President of the Park Board in San Francisco, told me that he wanted a big elephant for presentation to the wonderful children's playground he founded on the city's ocean front, I naturally classified the assignment as routine business. It eventually proved to be far from routine.

Mr. Fleishhacker had made Golden Gate Park a present of two smaller elephants that were in constant use. Each of these pachyderms carried six children at a time (in howdahs which I designed). The animals developed such popularity that it was growing difficult to accommodate all the children that wanted a ride.

Mr. Fleishhacker, pleased with the success of his elephants, asked me one day if I couldn't bring back an animal capable of accommodating more children than the medium-sized elephants he had. He wanted one on whose back a much roomier howdah could be placed so that the little boys and girls of San Francisco would not have to wait in line too long for a ride. He discussed the matter as gravely as if it were an important banking problem and I couldn't help feeling that the children of the city had a marvelous friend in this wealthy citizen who had not forgotten his boyhood days—who, in fact, revealed so much knowledge of what children consider good sport that you'd have thought it was only the day before yesterday that he was twelve himself.

I suggested that a good way of accommodating several children at a time would be to build a big ornamental wagon, as colorful as a merry-go-round, and capable of carrying twenty little passengers, or more. I would supply the right elephant to pull them around.

Mr. Fleishhacker was delighted with the suggestion and I was commissioned to deliver a good-sized elephant (for the sum of \$3,000).



Up in northern Burma an influential Burmese went to the British Colonial Forest officials in the district in which he lived and made a contract with them to keddah (or corral) the elephants in that district. This meant, among other things, that he had to visit native villages throughout this territory and make a thorough canvass of the various stretches of jungle with a view to determining where the different herds of wild elephants were and approximating the number of animals in each herd.

The Burmese keddah walla had many things to bear in mind. Only elephants of a certain size could be taken and only a fixed percentage of those from each district in the territory covered by his contract. There were other taboos that stipulated that the male leader of a herd could not be taken nor a full-grown breeding female. "Male herd leaders" are mentioned here with reservation. A big male is the real boss of every herd of elephants though an old female actually leads the herd as it moves from one feeding ground to another.

Males that were not herd leaders and young females comprised the main group of allowable captures — the size range taking in animals between four and eight feet

in height, although sometimes the corralling of bigger specimens was permitted.

When he had the lay of the land — when, in other words, he had taken a reliable census of the elephants in the area of jungle covered by his contract and had a good idea of how these animals were distributed over the stipulated territory — he fixed upon the best location for centralizing the beasts and here he built an enormous corral known as a keddah.

Elephants being a government concession, the Burmese had an arrangement with the government whereby he was to pay a fixed price for each animal he selected that came under the head of allowable catches.

All his arrangements made, the Burmese proceeded to build his keddah. Huge posts were driven into the ground a few inches apart and firmly lashed with rattan and wire cable. These posts covered an area of several acres that comprised the main keddah. Connecting with this, by means of a gate, was a smaller corral.

At one end of the big corral was a huge sliding door or gate that, for want of a better name, might be designated as The Main Entrance. It was into this opening that the elephants were to be driven, some of them never to return to the jungle.

When the keddah was finished, an army of native trackers, expert in the business of keeping elephants on the move, was sent out to drive the pachyderms in. By the time the drive began, the checkers had provided a reliable map indicating the approximate location of the different herds and an accurate census of each of them.

Hundreds of natives, in charge of lieutenants appointed by the keddah walla, or chief, take part in an elephant

drive. Too much is at stake to permit of any but whole-hearted methods.

My Burmese, a big man in his district, had secured financial backing for his elephant enterprise in Rangoon. A tremendous investment (certainly in terms of Burma) was involved. It was up to him so to conduct his drive that he would be able to round up the elephants he wanted with as little loss of time as possible. He had a big payroll that must not get out of hand. While each man received a very small sum for his services there were so many trackers and checkers that it would not be difficult to get "in the red" if the enterprise was sloppily conducted.

Disposing of his elephants was the least of the Burmese's problems. His main job was to round them up at a minimum of expense.

His army of trackers and checkers in motion, my Burmese was receiving bulletins at his headquarters on the progress of the roundup as a general receives communications on the progress of a battle. One messenger would come tearing in to report that this herd, consisting of so many elephants, was working in this direction; another courier would come on the run to report that such and such a herd had veered off the path that had been set for it but that the trackers, beating on their tin pans and making the other noises that were expected of them, were again in back of the off-course group and could be depended upon to work them back to the path that would lead straight to the keddah.

There are few sights stranger than that of any army of trackers working behind a herd of elephants. . . . No weirder combination of noises ever reached human ears, no more fantastic sight ever greeted eyes. Gesticulating

wildly and moving along like figures in an unearthly dance, the tin-pan pounders pummel their discordant instruments into masses of dents. Some of the panless boys pound anything else that will give off a noise. A few of the elect, natives with old muzzle-loading guns, superiorly brush past their unarmed comrades and shoot holes in the air by way of making their presence felt. Other natives, bearing firebrands and depending exclusively on lung power for their contribution to this Jungle Movie with Sound, shriek and scream and screech and howl like so many demons out of hell.

Forward, forward move the elephants. Closer and closer to the keddah they come, their movements in most instances as accurately controlled as if someone were working a giant steering wheel that sent them now to the right and now to the left. The helmsman — the lieutenant selected by the keddah walla to direct the din barrage — directs his forces by signals, swinging the tumult this way or that to suit the needs of the moment.

Usually the elephants are rounded up one herd at a time. This may mean anywhere from ten to twenty animals. Sometimes two herds are brought in together, the deafening armies behind them converging and driving the double catch in together.

In their joy over participating in a holiday-swing through the jungle that means money in return for noise, the natives sometimes forget that rounding up elephants is not without its dangers. My Burmese has had many proofs of this.

In the course of the drive that netted him the wild herd from which my Fleishhacker specimen was selected an over-aggressive native was wiped out so quickly his com-

rades hardly had a chance to realize what had happened. In fact, it was over so soon many of them didn't know about it until afterwards.

The herd had been driven to a position directly in front of the huge open door of the keddah. In a final assault on the ears of the all-but-trapped pachyderms, tin pans, guns, lungs and what not were called upon for a last epic outburst designed to stampede the frantic beasts through the opening of the great prison.

The demoniac hullabaloo had its effect, most of the elephants tearing forward madly according to the lieutenant's plan. They stirred a real breeze into being on a hot and windless day with their headlong rush into captivity, knocking against one another as they came on in a mass formation. It would have been a clean job of keddahing the whole lot if it were not for a female elephant that lagged behind with her calf, keeping three others from going in, including a fine young specimen that was particularly wanted.

An overzealous native — the poor devil I just mentioned — conceived the foolish notion of using a long bamboo pole to prod the lagging lady, who was half crazy with the din and in a panic lest something happen to her little one.

Normally that native would have known better than to do anything as foolish as that. Emboldened no doubt by the fact that the other elephants were in the pen, signifying one more victory for man over beast, and with the absence of fear that is common among natives at such a moment, the reckless one advanced with his pole and let the elephant have it. With a tremendous shrill trumpeting that gave voice to all the rage in her being she whirled around and charged her tormentor, grabbing him and raising

him up and stamping on him with her forefeet as she swung him back to earth. Before anyone could interfere she had pounded him into an unrecognizable mass, her trumpeting achieving a piercing high falsetto as she broke every bone in that luckless body. In record time the population of Burma had been decreased by one.

After some clever maneuvering by the lieutenant and a picked squad, the stragglers, including the killer and her calf, were driven into the keddah and the great door was locked.

The elephants were then worked from the big corral into the small pen where the keddah walla gave the whole herd a careful inspection (there were seventeen in all) to see how many of the animals complied with the clause of his contract with the British officials governing purchasable specimens and how many of these eligibles he wanted. He selected seven out of the lot, healthy young specimens that would fetch good prices at Rangoon where he marketed most of his elephants.

Four mahouts (keepers), on tame elephants accustomed to participation in such work, were sent in to perform the ticklish task of tying up the ones that were wanted. Cautiously they worked their mounts in among the herd, selecting the first animal to be tied, and carefully avoiding the tusks of the old bull herd-leader that acted as if he had a burst of indignation coming on. They sifted their way through the captives, cleverly surrounding the elephant that was to be No. 1 of the seven nominees to be put through the process of taming. Jockeying for position with the skill that only a trained mahout possesses, the expert four continued their maneuvers until they had their prisoner's side against the pen, two of them getting

alongside, lining up parallel to him, a third lining up in front at right angles to the side pair, and a fourth lining up in the rear and completing the square. Thus the captive was unable to move forward or backward or to either side. One of the mahouts — the most skillful and fearless of the quartet — then quietly slipped off his elephant, and, with a chain that he carried so deftly that it didn't rattle once as he alighted, got a quick hold on the back leg nearest the fence. A long stout rope was quickly tied to the chain and thrown out between the posts of the corral to a group of natives in charge of a pair of heavy work elephants. Speedily the rope was manipulated so that the elephants outside were tugging away until they had brought the wild specimen inside flush against the wall of the pen. The captive's other hind leg was then quickly tied and his front legs hobbled.

The six other prisoners were put through the same process until there were seven fine elephants tied up in the corral.

The gates were then thrown open and the rest of the herd were driven back into the jungle to breed more elephants to be keddahed in future years.

A man schooled in the art of handling wild elephants was assigned to each of the seven. The captives were nicely treated, food and water being regularly brought to them.

As soon as one of the captives showed signs of becoming manageable he was lashed to two tame elephants with ropes and chains and taken out of the pen to a near-by shed that was divided into stalls. Here his keeper put him through a further process of taming. With his front legs hobbled (and a rope to the back legs as a safeguard in case

he tried to make a getaway) he was taken for an occasional walk, at the start for a very short distance, this being increased as the animal grew tamer.

It was not long before the animal was resigned to his lot and doing whatever his mahout was asking of him. The same was true of the other six. There were a few rebellions but these were minor and quelled without any serious consequences. Once subdued, the rebels decided that they had more to gain by behaving themselves, which they did. By this I do not mean to say these seven elephants, comparatively fresh from the jungle, could be classified as tame specimens. They were moderately manageable, responding to the as yet simple commands of their mahouts.

While this taming process was going on other wild herds were being driven up to the keddah to be handled in the same manner.

Two of the seven were purchased by buyers representing teakyards located at Moulmein, two others were bought by representatives of interests at Bangkok and three were picked up by the Rangoon Zoo.

I came down to Rangoon from the interior about the time the three elephants were brought in and installed in the Zoo. They still showed signs of wildness but they were not hard to handle for animals that were practically fresh from the keddah, permitting themselves to be led about without much coaxing.

Not long before, I had delivered to the Rangoon Zoo an American buffalo, or bison, which they had ordered of me. This was the second animal of its kind ever seen in Asia. The first one I had presented to the Sultan of Johore, who for years had been anxious to secure a specimen to

keep in his deer park adjoining the palace in Johore Bahru. The Sultan had read a great deal about the American buffalo, and when I finally secured one for him he was delighted with it, this species having captured his fancy the very first time he had heard about it.

The officials of the Rangoon Zoo had offered me a worth-while trade for the buffalo and now that they had something I wanted, I decided to collect. One of those three new elephants, after the process of taming had been carried further, would be ideal for the Fleishhacker Play-ground. The Zoo officials agreed to let me have one of them in an even swap for the buffalo. I selected a fine healthy young lady that stood about eight feet in height. The animal I picked, with a little more training, would be just right for the job of hauling the kids around in the ornamental wagon that I had suggested to Mr. Fleishhacker.

The deal closed, I arranged with the British India Steamship Company at Rangoon to take the elephant (she afterward became known as Babe) to Singapore where I would install her in my compound. Little Ali, nephew of Old Ali, my No. 1 Malay boy, accompanied me on the trip.

In loading an elephant onto a ship a big canvas sling is fastened around the belly, the hold on the animal being further secured by ropes passed around the neck and under the tail. We had a hard job getting the sling around Babe on the dock at Rangoon. There was nothing in her conduct to indicate rebelliousness or a mean disposition but it was hard to get her used to the idea of something new. We finally got the sling around her and hoisted her on board but she trumpeted plenty of displeasure over the

business of being swung through space. She didn't like it a bit.

However, once we got her installed in her place on deck, she was again herself and gave all the signs of being the manageable animal I knew her to be. We reached Singapore without mishap and Babe was walked out to the compound, conducting herself en route in ladylike fashion and behaving very well for so new a captive on being placed in the temporary home which she shared with four smaller elephants that I had secured from a keddah walla in Siam. The Siamese pachyderms were more used to captivity, having been caught several months before Babe was driven in from the jungle. They required less attention than the lady from Burma, who was naturally friskier, her jungle freedom being still a recent memory.

But Babe made no trouble for us beyond the normal difficulties involved in completing the adjustment of a wild elephant to the idea of captivity. By way of preparing her for her career on the Pacific Coast I had a breast-band and traces made and hitched her to a heavy log that she pulled around daily. After a while she was going through this performance with a good deal of zest, starting to pull without waiting for the command by way of showing what a smart girl she was. So good-natured was her response that I was surer than ever that she would be perfect for the role of pulling little children around the Fleishhacker Playground in the gay wagon that was to be made for her.

Big Ali came out to assist me, and, by way of rounding out Babe's education, he taught her to lie down and get up; and with Little Ali on her back he walked her around the compound daily till she had done about a mile. She

seemed to enjoy these workouts, responding with a good will as soon as she understood what was wanted of her.

When all the specimens I had collected at Singapore were ready for shipment to the United States I arranged for passage on a cargo boat that was lying out in the bay about three miles from shore. This meant loading my collection (many varieties of animals, birds and reptiles) onto lighters from which we would transfer to the ship.

We loaded all my crates and boxes into motor lorries and bullock carts and started for the dock. The elephants, some led and some ridden by boys, brought up the rear. At the dock we quickly transferred the crates and boxes to the lighters, saving the elephants for last.

It was then that I made a mistake. I should have loaded Babe first. Instead I started with the other four elephants.

When the first of the four was lifted into the air by the dock's gear she started squealing and trumpeting. By the time she was lowered onto the lighter she had made quite a commotion. The other three were just as noisy, kicking up a big fuss the second they were lifted off the ground. There are few elephants that do not yell blue murder when you suddenly lift them into the air.

It was Babe's turn next. Not only had she demonstrated at Rangoon that she didn't enjoy being swung through space but she had also been listening to the protests of her predecessors. The others were too small to cause much trouble but Babe was a big husky lady, with a capacity for making trouble if sufficiently frightened. Having seen her balk at Rangoon, I should have loaded her first instead of giving her a chance to remember that this was a business that she did not like.

The Girl from Rangoon had made up her mind that

she was not going to be swung aboard the lighter. She balked the second we tried to get the sling around her belly. She would not have any of it. That was her story and she stuck to it.

We struggled and we struggled but we could not get the sling around her. She'd either raise up a foot and push the device away or get down on one side to keep us from slipping it under her. Over and over she repeated the performance, first fighting the sling with her feet, then getting down on her side. She had a chain tied to one front leg and a rope fastened to a back leg but there was enough play to enable her to go through this performance, which she did until I found myself perspiring and cussing freely.

The captain of the freighter (the only sea captain I've ever wanted to choke) kept yanking out an enormous watch and shouting that if I didn't hurry he'd have to leave without me. At the height of his peevish outburst Babe decided to get down on her belly and stay there, thrashing around with her trunk and trumpeting angrily as a warning that she wasn't enjoying this business at all.

By way of aiding me the captain kept bellowing that he was getting tired of waiting. So far I had held him up about twenty minutes, and I was sorry; but I was doing everything I could do to speed the loading of that stubborn elephant and the foolish skipper wasn't helping any with his repeated wail that we were losing time. I wouldn't have minded that, however, for I knew that he had to leave while the tide was high, but I felt like aiming for his jaw when he said, "I thought you knew your business. I wouldn't have let you ship with me if I thought it was going to be like this."

The chain dragged along after Babe as she ran, annoying her and slowing her up. When she was about ten yards ahead of us she stopped to pick it up with her trunk; and as we came up she started whipping it around like a big bull whip.

It was not my lucky day. As I stood there telling the boys what to do with their elephant hooks (I was too wobbly to wield one myself) the whirling chain struck me on the leg, wrapping itself around me in a rattle of metal. With the chain around my leg, Babe started to run, dragging me on one knee across the gravel that seemed all at once to become a series of saw-like points.

Luckily the two Siamese boys, as good a pair of elephant hands as I've ever known, didn't forget what to do with their hooks. Keeping in front of the would-be runaway they kept jabbing her in the trunk and forehead until they stopped her, after she had dragged me some fifty or sixty feet. The flesh was off my knee and I was a wreck, unable to stand up, when I was released from the chain that had crazily bound me to the elephant. I don't mind adding that I had had a bad scare and that this, added to my physical troubles, left me shakier than I had been in some time.

The captain, waving his watch in the air in a frenzy of despair, called upon heaven to witness that this was my last chance to leave with him for his boat three miles away. He would give me five minutes more and would go without me if I was not ready then.

I was licked. It was the first time in several years that I was faced by the prospect of leaving behind an animal that I had set out to bring back to America. There was nothing else to do. All my crates and cages had been

loaded on the freighter and my four elephants were in the last lighter below, the only part of my collection that had not been taken down the bay and hoisted on board.

I would have to leave; but I had no intention of abandoning that elephant. She was a fine animal, her erratic conduct having proven nothing except that fear of dangling by a sling in mid-air, a sensation that probably gave her a sickish feeling the first time she experienced it, was capable of making her seem like a vicious pachyderm.

As soon as she saw that no further efforts would be made to put a sling around her and lift her off her feet, Babe quieted down. The Siam boys, keeping their hooks handy, had her well in hand by the time I had used up only half of the captain's five minutes. I ordered Babe back to my compound, adding that I would send instructions later telling what I wanted done with her. . . .

I was soon busy putting into effect a plan that I considered worth trying.

I sent a telegram to a close friend in Singapore asking him to give Ali these instructions: The boy was to see Hin Mong at once and order the Chinese carpenter to build a platform strong enough for Babe to stand on. He was then to lead the elephant onto the platform, keeping her standing there while Hin built a crate around her out of heavy timbers with iron reinforcing bars, using the platform as the floor of the crate. If the elephant could be quickly crated, she was to be shipped to Manila on the first boat sailing, with ample food for a six-day trip. My friend Captain Yardley was due at Manila with the President Cleveland a few days after my boat was scheduled to arrive; so, in sending the animal to Manila, the thing

to do was to have her consigned to the Dollar Line, which I did.

When I arrived at Manila I found a telegram from Singapore advising me that the elephant was on its way aboard a Spanish boat. This vessel was due in Manila a few days after our departure and about the time the President Cleveland was scheduled to arrive. I arranged with the Dollar Line to ship the elephant from Manila to San Francisco, leaving a long letter of instruction for Bill Morris, mate of the Cleveland, as likable and intelligent a seaman as a man would want to know. I arranged for Bill to get at Hong Kong the food that Babe would need for the trip. . . .

. . . A week after I reached San Francisco, rested and almost entirely mended, the President Cleveland arrived, with Babe on board riding on top of the poop deck. The only elephant I had ever shipped by crate (and the only one, to my knowledge, ever transported in this fashion) made her American debut in splendid condition, furnishing one more proof of the hardiness of her species.

Not long afterwards, harnessed to the glittering wagon which I designed, reminiscent of the circus, Babe, the most mannerly of elephants, was pulling the children of San Francisco up and down the Fleishhacker Playground — and enjoying the work. She's doing it to this very day, and if there is a better behaved elephant anywhere in the country I'd like to know its name.

Every day of the year Babe goes through her paces, delighting hundreds of children. The last time I saw her at work I couldn't help enjoying the comment of an ecstatic mother who said, "Isn't she the gentle dear!" as she watched the Lady from Burma pull her little boy

around along with several other children. It was a warming confirmation of my own belief in the fundamental good nature of this animal even after she had almost blotted me out. . . .



If you enjoyed this story about elephants, read the book entitled *Bring 'Em Back Alive* by Frank Buck.

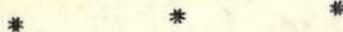


CAPTURING WILD DOGS IN NEWFOUNDLAND

by Charles Asbury Stephens

THAT faithful friend of man, the dog, was once a gray wolf, naturalists tell us; but even the naturalists confess themselves at a loss to account for that splendid animal, the black Newfoundland dog.

Fifty years ago, there were many small packs of these animals running wild in the great island of that name. Where did they come from? Where was their origin? Were they native to Newfoundland, or did some early voyager bring them? Were they black Norwegian dogs, that the Norsemen set free there a thousand years ago? Or, as some have suggested, did they reach those shores from the wreck of a French ship of the days of Jacques Cartier, Roberval and Frontenac?



One guess is as good as another. The Norse vikings, those sturdy rovers of the sea, Leif Ericson, Thorwald,

Thorfinn and many others, came down the American coast from Greenland to Helluland and Markland — as they named Newfoundland and Nova Scotia — and nothing is more likely than that, seeing herds of caribou ashore, they landed with their black dogs to hunt. The northern parts of Newfoundland still contain countless caribou. Some of those black Norse dogs may have been lost in the chase; or, finding game so abundant, the dogs themselves may have preferred to remain ashore rather than *go* aboard those cramped old viking ships.

This is at least my guess, and this is also the conclusion to which Cousin Addison and his young fellow naturalists, Alpheus Hyatt and Nathaniel Shaler, came while on a summer voyage to Labrador and Newfoundland in a schooner which Professor Agassiz chartered for them, back in the days when all three were students at the scientific school at Cambridge, Mass.

The schooner lay for five days in Ingornachoix Bay: the locality where the giant octopus now exhibited in the National Museum at Washington, was captured.

It was while at anchor there, off the mouth of one of the many small salmon rivers that enter from the gulf coast of Newfoundland, that the boys noticed the black heads of two animals swimming in the pool at the river mouth. The animals were fishing, and each of them was seen to capture a salmon. Addison and Shaler at first thought them young bears, but Hyatt declared that they were dogs — wild Newfoundland dogs. He was very anxious to capture one; and, as their schooner had been a fishing craft and still had a cod net aboard, he suggested setting it across the pool on the chance of catching a dog in its meshes, if the animals came back there to fish.

The net was accordingly overhauled and during the following afternoon was set out. But the schooner met with a strange adventure that night. Shortly after twelve o'clock the vessel was violently bumped and shoved to and fro at her anchorage. The skipper—Captain Hawkes—came hurrying to wake the student passengers.

"Here's something you will want to see," he shouted. "A school of white whales has come into the bay, hundreds of them, and they are tearing round like mad! They are a great sight."

It was a wild spectacle. Moonlight flooded the water, and on all sides the cove was flashing, silver-bright. Everywhere rose countless sparkling jets. The soft sounds made by the "blowing" of the big fish were continuous, to which were added frequent and alarming bumps of their heads against the schooner's sides.

No one knew what had brought these creatures there in such haste. The entire school appeared to be in a desperate hurry to go somewhere, or get something.

Strictly speaking, these fish were not whales, but large white porpoises, called beluga, from eight to fifteen feet in length, and weighing as much as two tons. They usually go in schools, occasionally of thousands, together, and at times seem possessed by a mad demon of impetuosity, leaping clear of the water and dashing headlong onward at the speed of a railway train.

Whether they were seeking food, or had become accidentally embayed there, was not easy to determine. As Addison stood by the rail watching them, one leaped from the water and fell with half its body on the rail, which creaked beneath its weight.

Skipper Hawkes grew alarmed lest the impact of their

heads might start the schooner's seams sufficiently to cause leaks. He began firing a rifle among them in the hope of frightening them away. The reports produced little effect. The wild rush continued unabated for an hour or more, when the school suddenly left the bay as precipitately as it had entered it. At this season of the year day dawned in these regions at two o'clock in the morning, and by that time not one of all that crazy multitude was to be seen. The school had gone on its roving way, and there seemed no great likelihood of its return.

Shortly after sunrise Addison discovered that the cod net which had been set for the dogs had disappeared from the pool at the river's mouth, and also that not a salmon was now to be seen there. Later, one of the buoys, attached to the net, was seen afloat half a mile down the bay. The skipper proceeded to recover it, and the net itself was hauled up, torn in several spots, but otherwise intact. Sinkers, buoys and everything else connected with it had been carried away in the rush.

While they were mending the net the unmistakable bark of dogs was heard at a distance in the woods. Hyatt still wanted badly to catch one, and so the net was again stretched across the pool at the mouth of the little river, with long lines for hauling it extending all the way to the schooner. Apparently the beluga had either captured or frightened the salmon away; but Hyatt was of the opinion that the dogs might still return to fish, since they were used to getting their food in that place.

Later in the day this guess was justified. Two black heads were again seen swimming about the pool; and presently another dog appeared, moving to and fro in the shadow of the trees on the riverbank, and followed closely

by three jet black puppies that looked to be no more than a few days old.

Watching a moment when the dogs were diving and on the near side of the net, the young naturalists hauled in vigorously, and at length brought it alongside. One of the dogs escaped and swam ashore; but by good luck the other's frantic efforts to dive beneath the net entangled him in it. Half drowned, the animal was finally drawn up the side of the vessel and secured.

Hyatt had no dog chain or collar for it, but he had prepared in advance a stout line, and had made what answered for a collar from leather cut out of the leg of a high boot. This was attached to the dog's neck and the line made fast to the foremast of the schooner. The net was then removed, while everyone drew back to see what would follow. The instant the captive felt himself free, it tried to leap overboard and struggled so wildly when brought up short by the line that it nearly choked to death. The piercing yells it sent forth were earsplitting.

Hyatt found it impossible to quiet the fears or the resentment of his captive. The dog paid no attention to the food and water which Hyatt offered it, baring its teeth and growling fiercely when approached. But Hyatt believed that it would quiet down and become docile after the schooner sailed and the other dogs were no longer within sight or hearing.

The captain had intended to weigh anchor and return to Great Mekattina Harbor that night; but heavy weather was setting in, the barometer was falling; and Captain Hawkes thought it safer to lay up in Ingornachoix Bay. With the rain and a gale blowing, and the continuous barking of the dogs, aboard and ashore, the young natu-

realists passed an unpleasant night. Sleep was out of the question. Hyatt had offered his captive a large packing box as shelter from the rain, but the animal disdained to enter it and stood out at the end of its rope, howling brokenheartedly. What Shaler remarked to Addison, or what Addison said to Shaler that night, is not available for this record. They did not let Hyatt overhear it.

During the morning the schooner dropped down to the entrance of the bay, with the intention of sailing, but such a heavy sea was running outside that Skipper Hawkes would not risk it, and the little craft beat back to its former anchorage off the mouth of the river. Earlier, when they had left, Hyatt's dog had struggled violently as if fully aware that it was being taken away from its home and kindred, and its howls redoubled when the schooner returned.

"Gosh all firelocks!" Uncle Simon, the schooner's cook, muttered. "Ef that was my dog, I'd let him go! I would, I swan!"

"Oh, he'll get over it as soon as we are away from here, and he doesn't hear the others calling him," said Hyatt. "He won't mind as soon as his appetite returns and he begins to eat." Hyatt was bent on taking back a native, wild Newfoundland dog to Cambridge with him.

It rained steadily, and the day passed with no further incident than the continued moaning and grieving of Hyatt's captive. It had ceased to bark, but whined dismally in response to the barking of the dogs ashore. Nothing could be done to console him, even the offer of a juicy piece of caribou venison failed to interest him.

Something never fully explained happened shortly after twelve o'clock that night. Everyone claimed to have been

sleeping when it occurred. A splash alongside waked Skipper Hawkes. At least that was what he asserted. That, too, was what Shaler and Uncle Simon affirmed. No one was on deck at that time. The skipper was the first up, and at once shouted down to Hyatt that his dog was gone. They all came up hastily. There lay the wet end of the captive's rope; and a critical inspection of it roused Hyatt's suspicion.

"That rope was cut!" he cried angrily.

"No; but the dog probably gnawed it off!" Shaler argued.

"I don't believe that," Hyatt retorted. "Some of you did it! A pretty trick after all the trouble we took to capture the animal!"

They attempted to convince Hyatt that the dog had gnawed the rope. "Those dogs have sharp teeth," Shaler declared. But Hyatt continued to mistrust them. An outburst of defiant barks from the darkness ashore added to his indignation, but he did not quite know whom to suspect — whether his two fellow students or Uncle Simon and the skipper. Nor did he ever find out certainly whether the rope had been cut, or the dog had gnawed it apart.

Once, a few days later, Hyatt looked Shaler in the eye and asked him point blank if Addison had done it.

"Well, I haven't heard Addison deny it," Shaler replied enigmatically.

Years afterward, while visiting Addison at the Yale University, Hyatt suddenly demanded, "Ad, was it Shaler who loosed my dog up there at Newfoundland that night?" And Addison's equally enigmatical answer was, "I never heard Shaler deny it."

No more do I know how the animal escaped; but for my own part I have always felt glad that the poor creature got away. Even a wild dog has certain rights of which no one ought ever to deprive him without good cause, and among these are life, liberty and the pursuit of happiness.



WITH AMERICAN INVENTORS

THE HORSELESS CARRIAGE

by Charles Franklin Kettering and Allen Orth

THE year is 1898. Suppose you walk to your front window and look out. Across the cobblestone street in front of your neighbor's house, a horse hitched to a buggy is trying in vain to reach the lower branches of the nearest shade tree and at the same time to make the hovering flies keep their distance by rhythmically switching his tail. Then your line of vision is intercepted by a young man industriously pedaling a bicycle. Bill Snead is delivering a prescription for his father, who owns the drug store down the street. It is a peaceful scene, undisturbed, except for the occasional rattle of a wagon or the clop-clop of a passing horse.

Suddenly the peaceful atmosphere is shattered by a series of explosions. At each one the horse across the way flinches and begins to tremble. The noise becomes louder and louder. It is coming this way. Following the example of Mr. Holt next door, you rush out on the porch to get a better view. Down the block you see a crowd of children surrounding some sort of contraption in the middle of the street which is apparently the source of the disturbance. The explosions become louder and you ask neighbor Holt: "What is that thing?"

"Don't know, unless it is one of those horseless carriages I read about the other day."

By that time the thing is abreast of the porch. With a prolonged wheeze it ceases its uncertain progress and silence reigns again. Curiosity gets the better of you, and you join the rapidly increasing crowd, just in time to overhear a snatch of the conversation between the perspiring individual driving it and one of the crowd:

" . . . Boston this morning, . . . have several automobiles there . . . "

While a man tries to calm the nerves of the near-by horse, the driver of the automobile crawls under the vehicle and begins to do things with a monkey wrench and a pair of pliers. After a while, apparently satisfied with the results of his labor, he goes round to the side and, grabbing a handle, turns it rapidly. Then comes an explosion. Another. The driver then climbs into the quivering seat of the buggy, grabs a projecting metal bar with one hand, does that and this with the other, and something else with his feet. Then with a series of snorts, the pseudo-buggy, quivering in every limb, crawls up the street and out of sight.

Perhaps, before you open the door of your house you glance over at the horse again peacefully munching at the leaves and feel a mental reassurance. The horse seems so permanent, so established in the scheme of things; his reliability stands out against a background of a man flat on his back under an imitation buggy! With a chuckle you say to yourself as you open the door: "All that fellow needs is a horse. He would then have a pretty good looking turnout."

The scene was typical of the period. The automobile caught most of the people unaware. But the keen observers could see that the world, in general, had been prepar-

ing for just such a thing for over a hundred years. Cranks, inventors, scientists—whatever you choose to call them—had for centuries been trying to find a mechanical substitute for the horse, and not without some degree of success. Large, ungainly steam coaches began to appear on the roads of Great Britain before the middle of the century. Regular service was established in 1831. But things were moving too fast. A toll of ten dollars was exacted for steam carriage—exorbitant in comparison with the dollar toll exacted for a horse-drawn vehicle. Not satisfied with this, the conservatives further required that each self-propelled vehicle carry three drivers and be preceded by a man carrying a red flag. The horse came out of this early skirmish with flying colors.

But on the western side of the Atlantic, things began to happen that started to undermine the horse's firmly established position in the order of things. The connection at first sight appears vague. In 1859 a man by the name of Drake sank a steel pipe in Titusville, Pennsylvania, and struck oil. One of the observers at the time wanted a small can of it, because he had an idea it would make a "mighty fine spread for buckwheat cakes." But actually the petroleum was used to produce kerosene to keep lamps burning. One thing, however, worried the refiners. They had a troublesome by-product—gasoline. They did not know what to do with it. Stoves were invented, street lamps erected, stationary gasoline engines built and naphtha launches designed. They all used gasoline, but in spite of this, a law was necessary to prevent the dumping of excess gasoline into rivers and harbors. If the refiners were lucky, they could sell it at less than a cent a gallon—but in the early nineties very few of them could sell it

at all, and they dared not throw it overboard. What then could they do with it? If some new invention would only appear upon the scene — something that would take this fuel off of their hands, their troubles would be over. The gasoline-driven horseless carriage appeared as an answer to their prayers. Twenty million horses were up against a funny proposition this time — a white elephant.

The horse idea, however, appears to have been a fixed notion. When you wanted something that would move, you naturally thought of the horse. Even when the first bicycle was built, it was made to look like a horse — like the one in a merry-go-round — a wheel between the front legs and another between the rear. In the nineties, however, the bicycle had its place in the picture. It was cheaper than the horse and buggy, could be used for pleasure or as a means of light delivery and, most important of all, it made the people road-conscious.

The stage was all set for the automobile in America. A plentiful supply of cheap fuel was available. Roads other than mud had begun to stretch themselves between towns. The people were divorcing, in their minds, the wheel from the horse. In 1876 rumors had already drifted in from Europe of an engine developed by a German named Otto — an internal combustion engine burning a hydrocarbon as a fuel. Benz, another German, seeing its application to a road vehicle, built a motor tricycle. A countryman of Benz, Daimler, quick to catch the trend of things, worked on the engine, reduced its weight and increased its power. So by 1885 Europe had begun to produce gasoline automobiles.

At the Chicago World's Fair in 1893, a Benz car was

exhibited — the first automobile imported into the United States. Things were beginning to move rapidly. America was bitten by a new bug — the automobile. Americans were quick to recognize the possibilities of the automobile — it seemed to represent transportation in its most desirable form, possessing speed and exclusiveness. But the conservatives were there too — gazing humorously at the snorting buggy careening up Main Street, or smiling in a self-satisfied manner as they drove their smart turnouts past a horseless buggy stranded by the wayside . . .

. . . It has been said that if you show a Yankee your idea of doing something, he can usually show you a better and cheaper way of doing it. Europe showed America the automobile. Then Yankee ingenuity got to work and began to develop it, but to gain public approval was difficult.

One of the acid tests of the worth of an article is its salability. Alexander Winton sold the first American-made car in 1898. To sell a car, particularly an American-made car, in those days was quite a job because of a firmly entrenched idea. The average man, when introduced to the automobile for the first time, inevitably echoed the thoughts of the man who, after his first glimpse of an automobile, said: "All it needs is a horse . . ." It was difficult to separate the horse from the buggy. Even after the two were separated, people were still apt to look for the horse when they had the buggy in mind — thinking he must be pushing instead of pulling or thinking that through some sleight-of-hand he had been reduced and hidden somewhere about the vehicle. The carriage and

the horse were the Siamese twins of vehicular transportation — the early manufacturers simply could not separate the two and have each function individually.

Even the builders of automobiles themselves shared the blame for this condition. They stuck to the horse-and-buggy idea, but left out the horse. When they designed a self-propelled vehicle, the buggy acted as the model. So early automobiles had four buggy wheels, a buggy dash, and buggy springs. Some of them even had a whip socket. Then came trouble. The horse idea had its limits. There was an engine to be considered. You could not steer with reins. Steel-tired wheels were not at all satisfactory. But the engine was the greatest problem. It was a question of putting it behind, in front, or beneath. So in order to preserve the time-honored lines of the buggy, it was put beneath and to the rear. Inaccessible, of course. Steering was accomplished with a tiller-bar — this being the first departure from the horse-and-buggy principle. Rubber tires solved the question of wheel cushioning. But, nevertheless, the 1898 automobile was nothing but a complete self-propelled buggy — just because people wanted buggies and because builders knew how to make them.

In addition to the sales resistance offered by the fixed idea of the horse and buggy, there existed a huge doubt as to the capability and reliability of the new vehicle. It often took the form of derision. Men crawling under cars, hammering at greasy parts, automobiles stranded or being towed — each picture told a story of unreliability that was hard to combat. Sometimes a peculiar twist was given, as we see in a news item issued by the War Department in 1899:

"Three automobiles have been purchased by the War Department for the use of officers. Each is equipped so that a mule may be hitched to it, should it refuse to run."

There was another thing that obstructed sales. Horseless carriages sold from one thousand dollars up. And you could buy more with the dollars of 1900 than you can with those of today. So the market was limited. A few doctors bought them, but in general the professional classes and the men of moderate means — that is, the majority of the population — still used the horse and buggy. The automobile makers were quick to see the poor policy of catering to the small class at the top. The majority had to be reached and persuaded. The man on the street had to be shown the benefits of the automobile rather than the disadvantages. The only way to do that was to make it possible for him to own one.

Winton, Haynes, and Duryea did not manufacture cars; they built them mostly by hand, with the aid of perhaps a lathe, a drill press, and men who were apt with their fingers — men who could plug holes in cast-iron cylinder blocks, construct spark plugs, and make a conglomeration of ill-fitting parts run. No wonder automobiles cost over a thousand! But even at that price there were not enough cars to go around. However, in order to reach the average man, cars had to be made in a more economical manner and in greater volume. New methods had to be used. Car makers could no longer make parts. They had to buy them outside. The parts, therefore, had to be more or less standardized. The manufacturers became assemblers and in the ensuing years found out how to do assembling very rapidly. Prices came down from an average of three thou-

sand dollars in 1900 to about six hundred dollars in 1916. Why? Because parts were standardized and because production increased for the corresponding years from fewer than five thousand cars to over a million and a half. That is one lesson America taught the world — to make more for less instead of less for more. People buy the things that are nearest their pocketbooks.

In the first years of the new century, a new personality appeared on the scene — Henry Ford. He had an idea — and it was a good one — that the slogan of the new industry should be "An automobile for everyone." In 1903 he set out to test his theory. In the ensuing five years, his sales increased from not quite two thousand to more than ten thousand cars. During this period, however, the rapidly growing automobile industry ran into a storm — one of those storms that harass established business at periodic intervals — a panic. And the infant, being new, did not know exactly what to do about it. In fact, economic planning was merely something one read about in textbooks. So fifty-two complete companies fell by the wayside.

But a panic cannot stop a people from wanting a thing, and people wanted automobiles. They wanted them more every day — advertising saw to that. The car makers had something to advertise too — cheaper cars, cars with dependable pneumatic tires with demountable rims, sliding transmissions, collapsible tops, side doors, and electric lights. Self-starters added over a million customers because women could not crank engines and men did not want to. The automobile had taken the American public by storm. Everybody wanted one, whether he could have it or not. . . .

TWO AMERICANS TAKE OFF!

by Frederick Houk Law

TWO boys, brothers, the older only eleven years of age, played together in a simply furnished room. Suddenly they heard steps and, looking up, saw their father enter.

"Ah! here's something for you!" he said, and tossed a buzzing contrivance into the air.

With a whir of wings, the thing flew to the ceiling, bumped, and fell to the floor.

"What is it?" the boys cried. "It flies!" Both jumped for the toy, now lying on the carpet.

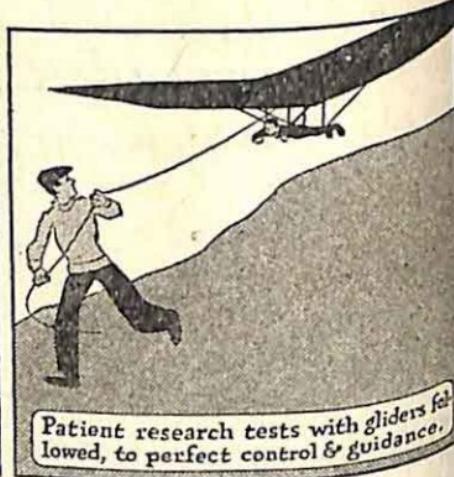
They picked up the cork-bamboo-and-paper thing, twisted its rubber bands again, and let it go.

With a rush the toy flew again to the ceiling, while the two boys shouted and the father laughed, glad to see that his sons liked the plaything he had brought them.

Who would have thought that the bringing of that toy would change the ways of men, give a new means of communication, revolutionize war, and enable explorers to sail at will over polar ice or tropic jungles?

Because Bishop Milton Wright, then a man fifty years of age, brought home that whirligig, that flying toy, and gave it to his two boys, Wilbur and Orville Wright, one eleven, the other seven, he set in motion the remarkable train of events that led his sons, in 1903, to invent the airplane.

Through their play, those two American boys changed the ways of the world for all time to come. Amused by the toy, they tried to see which could make it mount



higher. Then they studied it, found out just how it worked, and made another one like it that flew just as well.

"Why not make a bigger one?" said one brother.

"Of course!" said the other.

"We can make a better one, I know!"

They did make another flying toy, and hurrased excitedly to see it go.

"Let's make a great big one!" said one of the experimenters.

"Let's!" said the other, with equal enthusiasm.

There they met defeat. They used up all their rubber bands and tried in every way that they could think of, but beyond a certain size they could not make their toys fly. At last they put the whirligigs away and turned instead to something that they could make go just as high as they pleased — their kites.

Because they had unusual interest in kite-flying, they made better and better kites, and prided themselves on flying them higher than any other boys could fly theirs.

That play they carried on for life. Grown into man-



True flight at last! Their craft leaves the ground and flies under its own power.



They will remain forever the undisputed pioneers of sustained mechanical flight.

hood, for the sake of play the two brothers made a kind of box kite, or glider, that they could fly when they held it by a string. Then they made another large enough to glide along when one of them lay on it, or rather, in it.

"Why not make a bigger one, a better one?" they said again.

They did, and made a glider in which one of them, they found, could go a considerable distance.

"Why not make it go where we please?" they said. Then they soon learned how to control and guide their gliding apparatus.

"Why not make it move itself, wind or no wind?"

They made a light engine, placed it on the flying machine, flew with safety, and made their machine go where they wished it to go.

The two Wright brothers were the first in the world to learn how to fly. They had not tried to make money. They had not tried to become famous. All that they had tried to do, when they began their experiments, was to have a good time.

Curiously enough, perhaps, for boys, they had united

their play with study. If Wilbur and Orville Wright had merely played, and had not studied as well, they would never have invented the airplane. Neither of them ever went to college; neither, in the strict sense of the word, was a scientist. Nevertheless, by nature, both were students. They wished to know the "why" and the "how."

They had studied their first flying toy, found how it worked, and made a better one. They studied their kites, found just what shapes, sizes, and kinds of kites flew best, and then flew their own kites more successfully than other boys flew theirs.

In manhood the two brothers made the most patient study of the principles on which they based their great invention. They studied and experimented slowly, with all the patience of the most highly trained scientific investigators. They read all the books they could find that in any way concerned the subject. Since there was no one who could teach them how to fly, they taught themselves. They did not invent the airplane through a lucky accident, but as a result of daring experiments combined with long, intensive, scientific study.

For centuries men had looked upon flying as impossible of attainment. In the story of Icarus, who made wings that carried him until the heat of the sun melted their wax and thus cast him into the sea, the ancient Greeks laughed at the folly of attempting flight. In the latter part of the nineteenth century such stories as "Darius Green and His Flying Machine" made people think those who tried to fly were ridiculous half-wits who would come to disaster.

In the face of all this laughter of the centuries, one of the Wright brothers, after the invention of the airplane, said, "It is easier to learn to fly than it is to learn to walk."

In a period of only three years two brothers, who had been nothing more than makers and repairers of bicycles, did, for the pleasure of doing it, what people for ages had thought impossible!

First, they had to master three problems: the problem of making wings strong enough to carry men; the problem of finding a source of power that would propel wings and men through the air; and the problem of holding balance and giving desired direction while in flight. Although these were scientific problems that called for scientific answers, the two brothers who had never attended college or university solved them correctly.

In the first place, Wilbur and Orville Wright were brothers in thought and in deed. They lived, studied, and worked as one man. To that remarkable partnership in ideas and in work the world owes the airplane.

Wilbur Wright, the elder brother, was born near Millville, Indiana, April 16, 1867. Orville Wright was born in Dayton, Ohio, August 19, 1871. Their parents were educated and prosperous people. In their home they had a library of more than two thousand volumes, covering all the important fields of learning. The mother, in a time when it was not customary for girls to do so, had attended college and acquired a liberal education. She died in 1889, when the older brother was twenty-two years old; thus she did not live to see her sons become famous.

Milton Wright, the father, was a college graduate, a college professor, and at one time the head of a college. He was active, energetic, and enterprising, following in early life the hard work of a circuit rider, going in 1857 as a missionary to Oregon, then an almost trackless wilderness, becoming editor of a religious paper, and, in 1877,

bishop of the United Brethren. He lived until 1905, two years after his sons had discovered the art of flying. However, even he did not see his sons become famous. Curiously enough, for a few years, the invention of the airplane, though one of the most astonishing, revolutionary, and useful ever devised, created scarcely a ripple in the world. For five years it remained virtually unknown. It failed to impress people who saw it or who read about it because the people of the United States had laughed too long at the story of "Darius Green and His Flying Machine" and had seen too many attempts to fly come to grief.

Oddly enough, the two members of the Wright family who did not receive a college education accomplished the most for the world. At the local high school in Dayton, Ohio, they were faithful students, but in no way made themselves notable. Two older brothers went to college, and a sister, Katherine Wright, followed the classical course at Oberlin, but Wilbur and Orville Wright remained at home. The ones who had the least school training developed a new science!

After her student days at Oberlin, Katherine Wright, who had studied with her brothers in the Dayton High School, came back to her old school to teach. While she worked as a teacher, she did so much to help her brothers that the world owes her a debt, as it does to so many other self-sacrificing mothers and sisters. When the brothers, merely for amusement, began to experiment with gliders, and the first rude airplanes and needed money to buy materials, this schoolteacher sister drew upon her small salary and sent them money with which to carry on their work. When, engaged in making their most important

experiments at Kitty Hawk, North Carolina, they sent her photographs showing their "flying machine," she showed the pictures to the principal of her school, William Werthner, and interested him in what her brothers were doing. When they wished to read from technical books written in German, she asked Mr. Werthner to make translations for them. When they went to Europe, Katherine Wright went with them. There she shared, as she well deserved to share, in the public honors given to her brothers.

When Wilbur and Orville Wright were mere boys they had become interested in printing, had established a small newspaper, and had gained for it a remarkable circulation. They wrote, printed and delivered their own papers. Not satisfied with any press that they could buy, they made one of their own, and made it so well that it worked satisfactorily.

As a matter of fact, the whole Wright family was inventive. Bishop Wright invented a kind of typewriter, and often amused himself by making other ingenious devices. Lorin Wright, a brother, invented a hay-press.

From printing, the energetic brothers turned to the bicycle business. Both delighted in riding bicycles, and they made themselves experts, able to win races or to ride wheels in ways that most others could not imitate. Because they enjoyed mechanics, they made improvements in their own wheels, and finally set up a shop where they made and repaired wheels for others. They devised all sorts of bicycles, and, best of all, they satisfied all their customers. Thoroughness marked everything they did. In making an airplane, absolute thoroughness is necessary. They might have come to grief in their first experiments

The two bicycle makers worked with all the patience of men who had been trained by years of experience in scientific laboratories.

The inventors now devised rudders that they could move with the utmost ease. Then they made those rudders move in connection with the wings.

In September and October of 1902 they went at least a thousand times to the top of their hill and glided off through the air, every time gaining new control and gradually increasing the distance that they could go. Some of those flights they extended to six hundred feet, that is, to the length of almost three ordinary city blocks.

Such experimenters as Otto Lilienthal and Octave Chanute had tried to gain control of flying machines by movements of the body, placing the weight now here, now there. They were not able to make the instantaneous mental responses and the equally instantaneous movements required. They had followed a method by which one could hardly hope to succeed.

The Wright brothers made no effort to control their machine by shifting about in it. They decided to make the machine itself aid in the work. They planned to move the wings, when necessary, so that they could catch the air in a different way, to sit almost motionless, and, with slight movements of the hands, control levers that in turn changed the inclination of the wings. They observed every motion of their glider and every effect of the wind. They learned not only how to move the wings, but two rudders that they had made, so that they could keep the machine under control for the greatest length of time.

In spite of all their care they had many adventures,

Sometimes they lost control for a moment, and their machine landed them pell-mell. Sometimes they found the wind too strong, and landed upside down, most ingloriously. Wilbur Wright, who was a humorist, and his brother, who was an optimist, took all these mishaps as part of the work of the day. They knew they were not adventuring blindly, but following results of scientific study, and they determined to succeed.

The Wrights saw that they could control their machine while it was in the air, but that gravity soon brought it down to earth. Therefore, they needed a source of power that would keep the machine going. Then they thought of using propellers.

In this field they now made a thorough investigation, with the result that they learned that some of the largest steamships were failing to make use of all the power at their command. After many experiments, Wilbur and Orville Wright developed the propeller for the airplane.

Aside from its circular motion, they made the blades of their propeller so that they would strike the air, and lift, as well as pull, the machine.

Next, the two young men had to find an engine that would have force enough to operate the propeller at high speed, and, at the same time, would be light enough to be of use in a machine designed to fly through the air. If it had not been that the gasoline engine had already been invented, they would have met at this point an insuperable difficulty.

When they wrote to automobile manufacturers and asked for an eight-horse-power engine that would not weigh more than two hundred pounds, they met with a

complete lack of interest. Instead of being troubled by that, they set to work and in six weeks made an engine of their own! They were determined to fly.

They had now investigated, scientifically and through practical experiment, every phase of the principles involved in flying. They were prepared to bring all their results together, and, do what men had never done before — to fly!

So little had guesswork played a part in their preparation, that they actually succeeded at once. They found that even their propeller, that they had based on mathematical calculations, gave them in work sixty-six per cent of the power employed.

December 17, 1903, in the presence of an audience of five people, Wilbur and Orville Wright flew!

First, on December 14, they went to their newly made airplane.

"Who shall go first?"

"Toss a coin and see!"

Wilbur won the toss. With full confidence, but with a beating heart, he lay at full length on the airplane, gave the signal that all was ready, grasped all the controls, and set off. Three and one half seconds later, he landed with a rush, deep in the sand!

Next, on December 17, three days later, Orville took his turn. He was in the air only twelve seconds, hardly enough time in which to catch his breath, but in that time his machine jumped up and down in a most alarming manner and finally plunged toward the ground, but landed in safety!

That was the first time in all history that any flying machine had lifted itself into the air by its own power,

carried a man safely at high speed, and come down to earth without a mishap and without digging into the ground. That twelve-second flight was the beginning of successful aviation.

That day at Kitty Hawk the triumphant brothers made four successful flights, the longest distance being only three fifths of a mile, and the longest time in flight a little less than a minute!

A brief moment, but enough to prove that human flight was possible and to spur the Wrights on to make flying practical. Of their later difficulties they wrote: "With the machine moving forward, the air flying backward, the propellers turning sidewise, and nothing standing still, it seemed impossible to find a starting point from which to trace the various simultaneous reactions."

In 1904, on Huffman Prairie, near Dayton, Ohio, the brothers went on with their experiments. They had troubles enough to discourage anyone. Sometimes their engine would not work at all; sometimes it heated too easily. The sprockets came loose; the propeller shaft developed a flaw; and the tubular shafts cracked. Altogether they had adventures without number—but they kept on!

In 1905, the brothers flew twenty miles in thirty-three minutes.

In 1906, they brought their machine so fully under control that the man who operated it no longer lay down, as he had done up to that time, but sat up in a somewhat comfortable position.

Now they made a contract to furnish to the United States authorities a machine that would carry two men, as well as fuel, go at the rate of forty miles an hour, and stay

in the air long enough to cover 125 miles. They had won full success.

In 1908, Wilbur Wright went to France, where he made successful flights and won great public honors, including the Michelin Prize. A year later, in 1909, the man who had been only a maker and repairer of bicycles, demonstrated before the King of Spain, the King of England, and the King of Italy that he could fly and at all times keep perfect control of his machine. In the same year, with his brother, he received a medal given by the Congress of the United States.

Wilbur and Orville Wright now found themselves the most talked-of men in the world. They received honors, medals, titles, degrees, and money in a way that might have turned the head of almost anyone. But through all this avalanche of praise they continued simple, hard-working, and modest. They devoted themselves just as earnestly as ever to studying the problems of flight. In that work they continued together until May 30, 1912, when Wilbur Wright, then at the age of forty-five, died of typhoid fever.

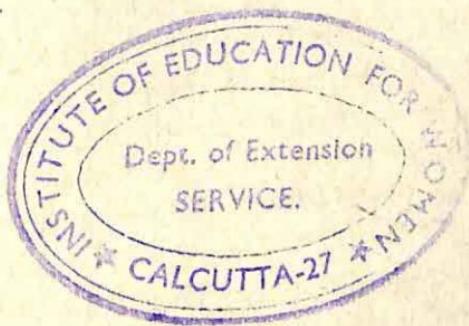
Always conservative, always basing their work on proved scientific principles, the brothers had avoided all serious accidents except one. In 1908, when Orville Wright was flying in company with Lieutenant Selfridge, one of the propeller blades broke, and both men were dashed to the ground. Lieutenant Selfridge met his death. Orville Wright broke his leg and several ribs. Aside from that sad event, they experienced the best of fortune.

Orville Wright has continued to investigate the many problems still connected with aviation. He is now chief

engineer of the Wright Aeronautical Company, and director of its laboratory at Dayton, Ohio, where he carries on his great work.

Today, airplanes fulfil many purposes, carrying passengers and mail, aiding in map making, in forest protection, in travel, in exploration, and in advertising. In a thousand ways they fulfil the purposes both of peace and of war.

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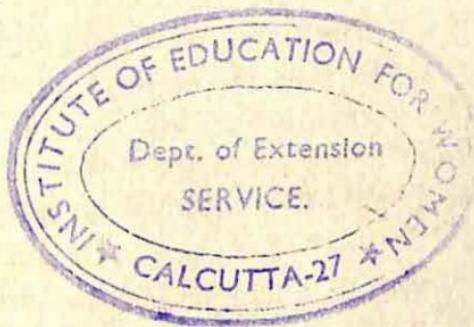
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WITH WHEAT FARMERS

THE HARVESTING RACE

by Ralph Connor

THE harvest time is ever a season of delightful rush and bustle. The fall wheat follows hard upon the haying, and close upon the fall wheat comes the barley, then the oats and the rest of the spring grain.

It was this year to be a more than usually busy time for the Boyle boys. They had a common purse, and out of that purse the payments on the mortgage must be met, as well as Dick's college expenses. For the little farm, with the profits from the mill, could do little more than provide a living for the family. Ordinarily the lads worked for day's wages, the farmers gladly paying the highest going, for the boys were famous binders and good workers generally. This year, however, they had in mind something more ambitious.

"Mother," said Dick, "did you hear of the new harvesting gang?"

"And who might they be?" asked his mother, always on the lookout for some nonsense from her younger son.

"Boyle and Fallows—or Fallows and Boyle, I guess it will be. Ben's starting with us Monday morning."

"Nonsense, Laddie. There will be no reaping for Ben this year, I doubt, poor fellow; and besides, I will be needing him myself."

"Yes. But I am in earnest, mother. Ben is to drive the

reaper for us. He can sit on the reaper half a day. At least, his doctor here says so. And he will keep us busy."

"If I cawn't keep the two of you a-humpin', though you are some pumpkins at bindin', I hain't worth my feed."

"But, Barney," remonstrated his mother, "is he fit to go about that machine? Something might happen to the lad."

"I don't think there is any danger, mother. And, besides, we will be at hand all the time."

"And what will two lads like you do following the machine all day? You will only be hurting yourselves."

"You watch us, mother," cried Dick. "We'll be after Ben like a dog after a coon."

"Indeed," said his mother. "I have heard that it takes four good men to keep up to a machine. It was no later than yesterday that Mr. Morrison's Sam was telling me that they had all they could do to follow up, the whole four of them."

"Huh!" grunted Dick scornfully, "I suppose so. Four like Fatty Morrison and that gang of his!"

"Hush, Laddie. It is not good to be speaking ill of your neighbors," said his mother.

"It's not speaking ill to say that a man is fat. It's a very fine compliment, mother. Only wish someone could say the same of me."

"Indeed, and you would be the better of it," replied his mother compassionately, "with your bones sticking through your skin!"

It was with the spring crop that Ben Fallows began his labors; and much elevated, indeed, was he at the prospect of entering into partnership with the Boyle boys, who were renowned for the very virtues which poor Ben con-

sciously lacked and to which, in the new spirit that was waking in him, he was beginning to aspire. For the weeks spent under Barney's care and especially in the atmosphere of the Mill household had quickened in Ben new motives and new ambitions. This Barney had noticed, and it was for Ben's sake more than for their own that the boys had associated him with them in their venture of taking harvesting contracts. And as the summer went on they found no reason to regret the new arrangement. But it was at the expense of long days and hard days for the two boys following the reaper, and often when the day's work was done they could with difficulty draw their legs home and to bed. Indeed, there were nights when Dick, hardly the equal of his brother in weight and strength, lay sleepless from sheer exhaustion, while Barney from sympathy kept anxious vigil with him. Morning, however, found them stiff and sore, it is true, but full of courage and ready for the renewal of the long-drawn struggle which was winning for them not only very substantial financial profits, but also high fame as workers. The end of the harvest found them hard, tough, full of nerve and fit for any call within the limit of their powers. It was Ben who furnished the occasion of such a call being made upon them. A rainy day found him at the blacksmith shop with the Mill team waiting to be shod. The shop was full of horses and men. A rainy day was a harvest day for the blacksmith. All odd jobs allowed to accumulate during the fine weather were on that day brought to the shop.

Ben, with his crutch and his wooden leg, found himself the center of a new interest and sympathy. In spite of the sympathy, however, there was a disposition to chaff poor

Ben, whose temper was brittle, and whose tongue took on a keener edge as his temper became more uncertain. Withal, he had a little man's tendency to brag. Today, however, though conscious of the new interest centering in him, and though visibly swollen with the importance of his new partnership with the Boyle boys, he was exhibiting a dignity and self-control quite unusual, and was, for that very reason, provocative of chaff more pungent than ordinary. Chief among his tormentors was Sam Morrison, or "Fatty" Morrison, as he was colloquially designated. Sam was one of four sons of "Old King" Morrison, the richest and altogether most important farmer in the district. On this account Samuel was inclined to assume the blustering manners of his portly, pompous, but altogether good-natured father, the "Old King." But while bluster in the old man, who had gained the respect and esteem that success generally brings, was tolerated, in Sammy it became ridiculous and at times offensive. The young man had been entertaining the assembled group of farmers and farm lads with vivid descriptions of various achievements in the harvest field on the part of himself or some of the members of his distinguished family, the latest and most notable achievement being the "slashing down and tying up" of a ten-acre field of oats by the four of them, the "Old King" himself driving the reaper.

"Yes, sir!" shouted Sammy. "And Joe, he took the last sheaf right off that table! You bet!"

"How many of you?" asked Ben sharply.

"Just four," replied Sammy, turning quickly at Ben's unexpected question.

"How many shocking?" continued Ben, with a judicial air.

"Why, none, you blamed gander! An' kep' us humpin', too, you bet!"

"I guess so," grunted Ben, "from what I've seed."

Sam regarded him steadfastly. "And what have you 'seed,' Mr. Fallows, may I ask?" he inquired with fine scorn.

"Seed? Seed you bindin', of course."

"Well, what are ye hootin' about?" Sam was exceedingly wroth.

"I hain't been talking much for the last hour." In moments of excitement Ben became uncertain of his h's. "I used to talk more when I wasn't so busy, but I hain't been talkin' so much this 'ere 'arvest. We hain't had time. When we're on a job," continued Ben, as the crowd drew near to listen, "we hain't got time fer talkin', and when we're through we don't feel like it. We don't need to."

A general laugh of approval followed Ben's words.

"You're right, Ben. You're a gang of hustlers," said Alec Murray. "There ain't much talkin' when you git a-goin'. But that's a pretty good day's work, Ben, ten acres."

Ben gave a snort. "Yes. Not a bad day's work fer two men." He had no love for any of the Morrisons, whose near neighbor he was and at whose hands he had suffered many things.

"Two men!" shouted Sammy. "Your gang, I suppose you mean."

Suddenly Ben's self-control vanished. "Yes, by the jumpin' Jemima!" he cried, facing suddenly upon Sam. "Them's the two, if yeh want to know. Them's binders! They don't stop at hevery corner to swap lies an' to see if it's goin' to rain. They keep a-workin', they do. They

don't wait to cool off before they drink fer fear they git foundered, as if they was 'osses, like you fellers up on the west side line there." Ben threw his h's recklessly about. "You hain't no binders, you hain't. Yeh never seed any."

At this moment "King" Morrison himself entered the blacksmith shop.

"Hello, Ben! What's eatin' you?" he exclaimed.

Ben grew suddenly quiet. "Makin' a bloomin' hass of myself, I guess," he growled.

"What's up with Benny? He seems a little raised," said the "Old King," addressing the crowd generally.

"Oh, blowin' 'bout his harvestin' gang," said his son Sam.

"Well, you can do a little blowin' yourself, Sammy."

"Guess I came by it natcherly 'nough," said Sam. He stood in no awe of his father.

"Blowin's all right if you can back it up, Sammy. But what's the matter, Benny, my boy? We're all glad to see you about, an' more'n that, we're glad to hear of your good work this summer. But what are they doin' to you?"

"Doin' nothin'," broke in Sam, a little nettled at the "Old King's" kindly tone toward Ben. "He's blowin' round here to beat the band 'bout his gang."

"Well, Sam, he's got a right to blow, for they're two good workers."

"But they can't bind ten acres a day, as Ben blows about."

"Well, that would be a little strong," said the "Old King." "Why, it took my four boys a good day to tie up ten acres, Ben."

"I'm talkin' 'bout binders," said Ben, in what could hardly be called a respectful tone.

"Look here, Ben, no two men can bind ten acres in a day, so just quit yer blowin' an talk sense."

"I'm talkin' 'bout binders," repeated Ben stubbornly.

"And I tell you, Ben," replied the "Old King," with emphasis, "your boys—and they're good boys too—can't tie no ten acres in a day. They've got the chance of tryin' on that ten acres of wheat on my west fifty. If they can do it in a day they can have it."

"They wouldn't take it," answered Ben regretfully. "They can do it, fast enough."

Then the "Old King" quite lost patience. "Now, Ben, shut up! You're a blowhard! Why, I'd bet any man the whole field against \$50 that it can't be done."

"I'll take you on that," said Alec Murray.

"What?" The "Old King" was nonplussed for a moment.

"I'll take that. But I guess you don't mean it."

But the "Old King" was too much of a sport to go back upon his offer. "It's big odds," he said. "But I'll stick to it. Though I want to tell you, there's nearer twelve acres than ten."

"I know the field," said Alec. "But I'm willing to risk it. The winner pays the wages. How long a day?" continued Alec.

"Quit at six."

"The best part of the day is after that."

"Make it eight, then," said the "Old King." "And we'll bring it off on Monday. We're thrashing that day, but the more the merrier."

"There's jest one thing," interposed Ben, "an' that is, the boys mustn't know about this."

"Why not?" said Alec. "They're dead game."

"Oh, Dick'd jump at it quick enough, but Barney wouldn't let 'im risk it. He's right careful of that boy."

After full discussion next Sabbath morning by those who were loitering, after their custom, in the churchyard waiting for the service to begin, it was generally agreed that the "Old King" with his usual shrewdness had "put his money on the winning horse." Even Alec Murray, though he kept a bold face, confided to his bosom friend, Rory Ross, that he "guessed his cake was dough, though they would make a pretty big stagger at it."

"If Dick only had Barney's weight," said Rory, "they would stand a better chance."

"Yes. But Dick ties quicker. An' he'll die before he drops."

"But ten acres, Alec! And there's more than ten acres in that field."

"I know. But it's standing nice, an' it's lighter on the knoll in the center. If I can only get them goin' their best clip—I'll have to work it some way. I'll have to get Barney moving. Dick's such an ambitious little beggar he'd follow till he bust. The first thing," continued Alec, "is to get them a good early start. I'll have a talk with Ben."

As a result of his conversation with Ben it was hardly daylight on Monday morning when Mrs. Boyle, glancing at her clock, sprang at once from her bed and called her sons.

"You're late, Barney. It's nearly six, and you have to go to Morrison's today. Here's Ben with the horses fed."

"Why, mother, it's only five o'clock by my watch."

"No, it's six."

Upon comparison Ben's watch corresponded with the clock. Barney concluded something must be wrong and routed Dick up, and with such good purpose did they hasten through breakfast that in an hour from the time the boys were called they were standing in the field waiting for Ben to begin the day's work.

After they had been binding an hour Alec Murray appeared on the field. "I'm going to shock," he announced. "They've got men enough up at the thrashing, an' the 'Old King' wants to get this field in shock by tomorrow afternoon so he can get it thrashed, if you hustlers can get it done by then." Alec was apparently in great spirits. He brought with him into the field a breezy air of excitement.

"Here, Ben, don't take all day oiling up there. I guess I'm after you today, remember."

"Guess yeh'll wait till it's tied, won't yeh?" said Ben, who thoroughly understood Alec's game.

"Don't know about that. I may have to jump in an' tie a few myself."

"Don't you fret yourself," replied Dick. "If you shock all that's tied today you'll need to hang your shirt on the fence at night."

"Keep cool, Dick, or you'll be leavin' Barney too far behind. You tie quicker than him, I hear."

"Oh, I don't know," said Dick modestly, though quite convinced in his own mind that he could.

"Dick's a little quicker, ain't he?" said Alec, turning to Barney.

"Oh, he's quick enough."

"Did you never have a tussle?" inquired Alec, snatching up a couple of sheaves in each arm and setting them in their places in the shock with a quick swing, then stepping off briskly for others.

"No," said Barney shortly.

"I guess he didn't want you to hurt yourself," he suggested cunningly to Dick. "When a fellow isn't very strong he's got to be careful." This was Dick's sensitive point. He was not content to do a man's work in the field, but he was miserable unless he took first place.

"Oh, he needn't be afraid of hurting me," he said, taking Alec's bait. "I've worked with him all harvest and I'm alive yet." Unconsciously Dick's pace quickened, and for the next few minutes Barney was left several sheaves behind.

"He's just foolin' with you, Dick," jeered Alec. "He wouldn't hurt you for the world."

Unconsciously by his hustling manner and by his sly suggestions of superiority now to one and again to the other, he put both boys upon their mettle, and before they were aware they were going at a racing pace, though neither would acknowledge that to the other. Alec kept following them close, almost running for his sheaves, flinging a word of encouragement now to one, now to the other, shouting at Ben as he turned the corners, and by every means possible keeping the excitement at the highest point. But he was careful not to overdrive his men. By a previous arrangement and without serious difficulty he had persuaded Teenie Ross, who had come to assist the Morrison girls at the threshing, to bring out a lunch to the field at ten o'clock. For half an hour they sat in the long grass in the shade of a maple tree eating the lunch which

Dick at least was beginning to feel in need of. But not a minute more did Alec allow.

"I'm going to catch you fellows," he said, "if I've to take off my shirt to do it."

Dick was quick to respond and again set off at full speed. But the grain was heavier than Alec had counted upon, and when the noon hour had arrived he estimated that the grain was not more than one third down. A full hour and a half he allowed his men for rest, cunningly drawing them off from the crowd of threshers to a quiet place in the orchard where they could lie down and sleep, waking them when time was up that there should be no loss of a single precious moment. As they were going out to the field Alec suggested that instead of coming back for supper at five, according to the usual custom, they should have it brought to them in the field.

"It's a long way up to the house," he explained, "and the days are getting short." And though the boys didn't take very kindly to the suggestion, neither would think of opposing it.

But in spite of all that Alec and Ben could do, when the threshers knocked off work for the day and sauntered down to the field where the reaping was going on, it looked as if the "Old King" were to win his bet.

"Keep out of this field!" yelled Alec, as the men drew near; "you're interferin' with our work. Come, get out!" For the boys had begun to take it easy.

"Get away from here I tell you!" cried Alec. "You line up along the fence and we'll show you how this thing should be done!"

Realizing the fairness of his demand, the men retired from the field. The long shadows of the evening were

falling across the field. The boys were both showing weariness at every step they took. Alec was at his wit's end. The grain was all cut, but there was still a large part of it to bind. He determined to take the boys into his confidence. He knew all the risk there was in this step. Barney might refuse to risk an injury to his brother. It was Alec's only chance, however, and walking over to the boys, he told them the issue at stake.

"Boys," he said, "I don't want you to hurt yourselves. I don't care a dern about the money. I'd like to beat 'Old King' Morrison and I'd like to see you make a record. You've done a big day's work already, and if you want to quit I won't say a word."

"Quit!" cried Dick in scorn, kindling at Alec's story. "What time have we left?"

"We have till eight o'clock. It's now just seven." "Come on then, Barney!" cried Dick. "We're good for an hour anyway."

"I don't know, Dick," said Barney, hesitating. "Come along! I can stand it and I know you can." And off he set again at racing pace and making no attempt to hide it.

In half an hour there were still left them, taking two swaths apiece, the two long sides and the two short ends.

"You can't do it, boys," said Alec regretfully. "Let 'er go."

"Yes, boys," cried the "Old King," who, with the crowd, had drawn near, "you've done a big day's work. You'll hurt yourselves. You've earned double pay and you'll get it."

"Not yet," cried Dick. "We'll put in the half hour at any rate. Come on, Barney! Never mind your rake!"

His face looked pale and worn, but his eyes were ablaze with light, and but for his pale face there was no sign of weariness about him. He flung away his rake and, snatching up a band, kicked the sheaf together, caught it up, drew, tied, and fastened it as with one single act.

"We'll show them waltz time, Barney," he called, springing toward the next sheaf. "One"—at the word he snatched up and made the band, "two"—he passed the band around the sheaf, kicking it at the same time into shape, "three"—he drew and knotted the band, shoving the end in with his thumb. After him went Barney. One—two—three! and a sheaf was done. One—two—three! and so from sheaf to sheaf. It took them fifteen minutes to go down the long side. Dick, who had the inside, finished and sprang to his place at the outer side.

"Get inside!" shouted Barney, "let me take that swath!"

"Come along!" replied Dick, tying his sheaf.

"Fifteen minutes left, boys! I believe you're going to do it!" At this Ben gave a yell.

"They're goin' to do it!" he shouted, stumping around in great excitement.

"Double up, Dick!" cried Barney, carrying one sheaf to the next and tying them both together. Dick followed Barney's example, but here his brother's extra strength told in the race. Close after them came the crowd, Alec leading them, watch in hand, all yelling.

"Two minutes for that end, boys!" cried Alec, as they reached the corner. "You're goin' to do it, my hearties! You're goin' to do it!" They had thirteen minutes in which to bind a side and an end.

"They can't do it, Alec," said the "Old King."
"They'll hurt themselves. Call them off!"

"Are you all right, Dick?" cried Barney, swinging on
the outer swath.

"All right," panted his brother, striding in at his side.

"Come on! We'll do it, then!" replied Barney.
Side by side they rushed. Sheaf by sheaf they tied to-

gether, Barney gradually gaining by the doubling process.
"Don't wait for me," gasped Dick, "if you can go

faster!"
"One minute and a half, boys, if you can stand it!"
cried Alec, as they reached the last corner. "One minute
and a half, and we win!"

There remained five sheaves on the outer of Barney's
two swaths, two on the inner of Dick's. In all, nine for
Barney, six for Dick. The sheaves were comparatively
small. Springing at this swath, Barney doubled the first
two, the second two, the third two, and putting the last
three together swung in upon Dick's swath where there
were two sheaves left.

"Don't you touch it!" gasped Dick angrily.

"How's the time, Alec?" panted Barney.

"Half a minute."

Before he spoke, Dick flung himself on his last two
sheaves, crying, "Out of the way there!" snatched his
band, passing it around the sheaf, tied it, flung it over
his shoulder, and stood with his hands on his knees, his
breath coming in sobbing gasps.

For a few minutes the men went wild. Barney stepped
to Dick's side, and patting him on the shoulder, said,
"Great man, Dick! But I was a fool to let you!"

"That's what you were!" cried the "Old King," slap-

ping Dick on the back, "but there's the greatest day's work ever done in these parts. The wheat's yours," he said, turning to Alec, "but begad! I wish it was goin' to them that won it!"

"An' that's where it is goin'," said Alec, "every blamed sheaf of it, to Ben's gang."

"We'll take what's coming to us," said Barney shortly.

"I told you so," said Ben regretfully.

"Why, don't you know it was for you I took the bet?" said Alec, angry that he should be balked in his good intention to help the boys.

"We'll take our wages," repeated Barney in a tone that settled the controversy. "The wheat is not ours."

"Then it ain't mine," said Alec, disgusted, remembering in how great peril his \$50 had been.

"Well, boys," said the "Old King," "it ain't mine. We'll divide it in three."

"We'll take our wages," said Barney again, in sullen determination.

"Confound the boy!" cried the "Old King." "What'll we do with the wheat? I say, we'll give it to Ben; he's had hard luck this year."

"No, by the jumpin' Jemima Jebbs!" said Ben, stumping over to Barney's side. "I stand with the boss. I take my wages."

"Well, doggone you all! Will you take double pay, then? There's two days' good work there. And the rest we'll give to the church. Good thing the minister ain't here or he'd kick too!"

"But," added the "Old King," turning to his son Sam, "after this you crawl into your shell when there's any blowin' bein' done about Ben's gang."

GRASSHOPPER BATTALIONS

by Rose Wilder Lane

THE descent of the grasshoppers was, mercifully, a nightmare. It was a horror, but it was unbelievable. Some saving resistance in Charles and Caroline refused to believe it. They refused to believe that they would not save the wheat.

The windless day encouraged them. They could control the fires they lighted. Surely the grasshoppers, with hundreds of miles of prairie before them, would avoid flames. Before the winged creatures had ceased to fall from the sky, Charles had driven the snorting, trembling horses thrice around the wheat field. Three furrows of upturned earth protected the wheat from the fire he set in the wild grass.

It was Caroline's part to follow the fire along the strip of plowed ground, to keep the flames from crawling or leaping into the wheat. Charles had the harder task of fighting the fire in the grass. If it escaped him, the whole country would be burned over; nothing, then, could keep the grasshoppers out of the field. But there was no wind.

The fire ran merrily crackling, sending up waves of fiercer heat into the heat of the sun. All the glassy air was in motion. Back and forth Caroline ran, gasping, beating at wisps of burning grass, stamping them into the earth with her feet. For moments together she lost sight of Charles. *The smoke came in gusts, stinging her eyes, her throat. With the smell of the clean smoke there was another, oilier smell; grasshoppers, caught by the licking*

heat, fell wingless into the fire. Their bodies burst with soft, popping sounds.

It seemed that this madness of fighting had never begun, would never end. There had never been and would never be anything but this fierce, relentless and desperate battle. Yet it ended. The last clump of burning grass smoldered on blackened ground.

Caroline dissolved in trembling. Having nothing to lean against, she swayed and the firm earth held her. It was good to lie on.

Charles came striding to her and glanced quickly to see that she was all right. He was grimy with smoke, his eyelashes were gone and the hair was scorched from his arms.

"They don't seem to be eating anything," he said huskily, and coughed. "Maybe it was a false alarm."

Caroline sat up, then got to her feet, steadying her knees. The wheat stood as before, golden-green and beautiful, with a whirring of grasshoppers over it.

"You go in and rest," Charles said. "I'm going to keep up a good thick smudge. That'll do the trick!"

She walked through the grasshoppers thick as spray around her knees. They crunched sickeningly under her feet; she could not avoid stepping on them. Grasshoppers were in her hair, in her sleeves, in her skirts. Her ears tried to shut out the whirring of their wings.

Mechanically she cared for the baby. At the usual time she cooked supper. That night she fed the horses and led them to water. Charles was cutting slough grass and piling it on the burned strip around the wheat field. Thick smoke rose and spread in the motionless air.

Caroline kept supper warm for a long time. At last

she let it grow cold. She lay down without undressing and slept a little. Charles came in at last, too tired and restless to eat. He was angry when she urged him to rest.

"I'm not a baby! Losing a little sleep won't hurt me!" he said.

She went with him to the wheat field. In the starlight they stirred the heaps of smoldering grass, buried the flames under masses of dampened stalks, kept the heavy smoke pouring into the air.

Dawn came murky through the smoke hanging over the wheat field. When the sun's first rays struck across the prairie, a sound rose from it. It was a small, vast sound of innumerable tiny jaws nibbling, crunching. A trembling began in the wheat field. Tall stalks shivered; here and there one moved as if it were struggling. It swayed and leaned crookedly against its fellows.

Charles shouted hoarsely and plunged into the field. They had never gone into the wheat, not even to examine it, unwilling to break down one precious stalk. Now Charles trampled them down; he tore them up by armfuls, shouting, "Caroline, quick! Come help! Quick!"

Smudges placed thickly through the field might save some of it. Charles raved, "Fool! Fool! Why didn't I do this sooner?"

It was like tearing their own flesh, to tear up the roots of the wheat, to pile up heaps of ripening grain and set fire to it. They worked in the smoke, in the heat, destroying the thing they wanted to save. A sacrifice of part might save the rest. They trampled down the thick stalks, they cleared spaces, they smothered the flames of burning wheat with the earth on its roots.



Through the smoke, Charles shouted, "Caroline, you get out of this! Go back to the dugout and stay there!"

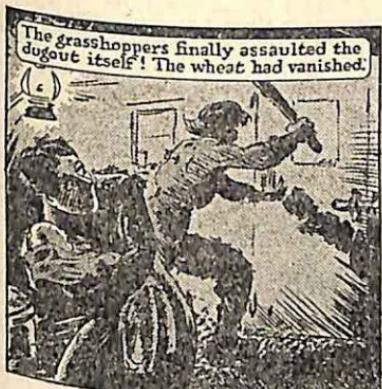
She went on working till he came to her. She said, "No, Charles, I —"

Coughing in the smoke, he croaked, "Get out, I tell you! What're you thinking of? You're nursing the baby!" Tears from his reddened eyes smeared the grime on his cheeks.

At the edge of the field she heard again that sound of nibbling. She stood and looked at the wheat. Scores of stalks were moving jerkily, as if they were struggling. The nibbling sound came from the whole prairie. It was not so loud as the flight of grasshoppers before her skirts, but it was continuous. It did not grow louder or softer; it did not stop. The prairie grasses had everywhere a restless movement, not made by any breeze. It sickened her to feel grasshoppers crushing to slime on the soles of her shoes.

The Svensons were burning smudges around their poor little field of sod potatoes and turnips.

Outside the door of the dugout she took off her shoes.



In the doorway she took off her dress and petticoat and shook the grasshoppers out of them. The baby lay wailing in his cradle. She talked and sang to him while she bathed in the washbasin, then took him in her arms and lay down to rest. He cried hungrily. When she was cooler she let him nurse, and fanned him until he fell asleep. Then she fetched water from the creek and mixed a generous drink of vinegar, molasses, and water to take to Charles.

Every hour she carried a cool drink to him. She took him food, but he would not stop to eat. His wild look frightened her. She could not persuade him to leave the field where he was working in the heat, under the blazing sun. That evening she did the chores again, and went to the field determined to make Charles rest. He would not listen to her. But the sun was sinking at last.

The baby had the colic; she could not leave him again. She fed him peppermint water and patiently walked up and down, patting his little buttocks while he yelled on her shoulder. She carried him up the path and looked at smoke rising luridly in the starlight. Every step

crushed the loathsome grasshoppers, and even in the night she could hear their nibbling.

Next morning the baby slept, exhausted. Caroline took tea and bread to Charles. He drank thirstily and choked down a few mouthfuls of bread.

"We'll save some of it," he said, looking at the ravaged field. "Not much, but some. I figure near a tenth of it's still standing. They can't take all of it, you know. It isn't possible. Some of it's bound to be left. Enough for flour and seed. If we just have seed — I can get time on those debts. If I just keep up this smudge."

Caroline felt a little hope. If even a few stalks were left, here and there, she and Charles could gather each one carefully. They could live that winter on game and the sod potatoes, and put in another crop in the spring.

Then the rising sun struck her shoulders with its heat. Time did not seem to be passing; it stood still, quivering a little under the cruelty of the sun, trembling a little to the ceaseless, metallic nibbling.

That afternoon the grass was no longer standing on the prairie. It lay as if mowed, and still it was restlessly shaken. Bringing a pail of water from the creek, Caroline halted and stared at the little plum trees. Not a leaf was left. She went into the dugout and set about mixing the vinegar and molasses for Charles' drink. The doorway behind her darkened. She was still an instant, then turned.

Charles' eyes were red in his sooty face. He straightened his shoulders and tried to speak robustly through a raw throat:

"Well, Caroline, the jig's up. I—I can't—" His

mouth twisted and he said brutally, "The wheat's gone. Every spear." He dropped heavily onto the bench.

Caroline had known this would happen; she had known it when the first wheat stalk fell. She had known it when the nibbling began. Now it had happened, and something within her cried out that it could not be true.

"Why don't you say something?" Charles raged at her. And he covered his face with his hands.

Caroline turned away instantly. She mustn't let him break down.

"I guess if there isn't any wheat, we'll get along without it," she said equably. "You've got along all right without it so far."

But they had never been in debt before.

She measured the molasses, poured the vinegar, stirred the mixture round and round. "I'm mixing up some vinegar and water. You'd better wash up and drink it while it's nice and cool."

To her surprise she began to cry. Her mouth writhed uncontrollably and tears ran from her eyes. She went on stirring till she heard Charles at the washbasin; then she dried her face and blew her nose.

Charles wiped his blistered arms gingerly, ran the comb through his wet hair, and drained the cup she handed him. "Gosh, Caroline, that hits the spot!"

"You're hot and tired," she answered. Even in the dugout the maddening ceaseless sound of nibbling gnawed at their ears.

Tears brimmed his raw lids. He drew her against him where he sat on the bench. She felt the sob shake his body when he turned his face against her shoulder, and she knew that, as she had clung to him when the baby

was born, he was clinging to her in this misery too great to bear alone.

"There, there," she said. "It's all right. I was afraid you'd get sunstroke. We're going to be all right."

"Oh, Caroline, if I hadn't been such a fool! Those debts I ran up — How'll I ever pay — in debt almost two hundred dollars — Not even flour for this winter; not even seed."

"Never mind now. You'll manage all right. You're tired; you're worn out. You'll feel better when you've had some sleep."

He slept heavily, exhausted. Next morning his face was creased and his eyes swollen. After he had done the chores and eaten breakfast, she persuaded him to lie down again. He fell asleep at once, and Caroline sat quiet in order not to disturb him. Her head was heavy and she let it sink against her arm on the table. Dozing, she was all the time aware of Charles in the bunk, of the baby on the floor. Her eyes opened and she saw the baby absorbed in his own pink feet. He frowned intently, staring with slightly crossed eyes at the inexplicable things wavering about him, and patiently he tried to lay hold of the toes that eluded his uncertain grasp.

Suddenly Caroline was aware of a new sound — a rasping, clicking, scratching sound. It crawled up her spine and over her scalp. She started to her feet, and saw the top of the doorjamb rippling like a snake. The clean black line was scaly, and rippling, pouring inward.

She snatched up the baby, wrapped him in her apron, covered him with her arms. Then she saw the thing clearly. The grasshoppers were coming into the dugout. The ridged long backs jostled one another. Hundreds,

thousands of hard, triangular heads, knobbed with eyes, pointed with nibbling jaws, were coming downward, turning, moving inward over the doorjamb.

She screamed, "Charles! Charles!"

The door stood open against the creek bank. She seized the latch. An instant later she saw the whole earth crawling — path, creek bank, prairie, scaly and crawling. The door closed horribly, crunching grasshoppers. "Charles!"

He seized her. "Caroline, what — you're sick!"

Her teeth were chattering.

She screamed, "No! No! Kill them! Kill them!" In the dark she could hear them crawling.

Charles lighted the lamp. She stood trembling while he killed them. He brushed them from ceiling and walls, crushed them with his boots, hunted them out of the hay box and the stove. He shook them out of the bedding and swept them from beneath the bunk. He looked into the water pail.

"Throw it out!" she cried.

"I don't know — you want me to get more?"

"No, no, don't open the door! I'll boil it!"

He skimmed them out of the water with the dipper.

She was ashamed to be behaving so, and with an effort she ceased to tremble and relaxed her clenched jaws. Then the baby screamed, a sharp yell of pain. Caroline quickly uncovered him on her lap. From his soft armpit a grasshopper leaped, struck her cheek, stirred its claws there and crawled. She struck it away and began to cry loudly, like a child. For a time she could not stop crying, even in Charles' arms. When she was quiet, they heard the grasshoppers crawling on the paper windowpane.

Grasshoppers were a mottled shadow crawling steadily downward across it, and by that they knew that the whole earth was still crawling in the sunlight outside.

All that night the creatures crawled, and all the next day. Charles slipped out to take care of the horses. When he came back, Caroline did not ask him any questions. They sat all day in the dugout behind the closed door.

"The railroad's left," Charles said. "This won't stop the railroad. I'll go back to work on it for a while. Oh, we're not licked yet by a long ways! We'll make out all right."

"Of course we will," Caroline said. "We always have."

She knew how he hated to go back to work on the railroad. It had been different when they were starting out. Now for a year he had had his own land; he had been independent. It was hard to go back obeying other men's orders for wages. But it couldn't be helped. When they were silent, they could hear the claws on the paper pane.

Late that afternoon the oiled paper shone clear. Charles opened the door.

As mysteriously as they had come, the grasshoppers were going. They had ceased to crawl, they had left the ground. A translucent cloud, colored like mother-of-pearl, swept northwestward across the sun.

The prairie was bald earth, not a blade of grass remained. Dust blew in the evening breeze. A faint stench rose from the creek. The water was solidly filled with drowned grasshoppers, rotting. No more clean water remained in all that country.

"I didn't want to worry you," Charles said, "but the horses haven't had water since yesterday morning."

They've been two days without water in this heat. Creek was full of grasshoppers when I went out yesterday."

Long after sunset he worked, digging a hole in the slough. Mr. Svenson came, carrying a shovel and a pail and leading his oxen. They worked together, digging. When the hole was deep enough, they had to wait for water to seep into it.

At midnight the horses and the oxen drank, and Mr. Svenson started home with the pail full of water. Caroline was lying awake when Charles came in, mud-stained and cheerful. She sat up eagerly to drink from the brimming dipper he gave her.

"Thank God the horses are all right," he said. "I'll be sure to get a job with the teams."

There had been no use trying to dig a well while the grasshoppers were crawling. "Nothing stopped them," he told Caroline while he took off his boots. "No matter what they came to, they went right on. They were crawling up one side of the barn and down the other. Crawling west. They crawled straight into the creek, never stopped. They crawled into it and drowned till they clogged it up and the others crawled across on their backs. Caroline—" He hesitated. "I wish you'd seen it. A thing like that! It was— They had some idea, or— Would they do a thing like that without knowing why? I tell you they were bound to go west. All the powers of hell couldn't 've stopped them."

He and Caroline looked at each other for a long moment. She asked, "You don't think—"

"What?" he asked at last.

Neither of them could say what they felt. The grasshoppers—crawling into the creek and drowning till the

others crossed on their backs. Grasshoppers, going west — like the railroads, like the people, like cities and settled lands and law and government. Yet grasshoppers were as alien, as indifferent to human suffering, as wind or cold. Perhaps they were no more indifferent to human beings than human fate itself.

"Well, it's good the horses were saved," Caroline said.
"We better go to sleep if you're getting up early."

He drove away next morning before daylight. The nearest railroad camp was twenty miles away and he said cheerfully that he'd waste no time getting there.

"If I get a job," he said — "I mean if the foreman puts me to work right away — I'll stay with it. I'll try to find a rider coming this way and send you word, but don't be worried if I don't get home tomorrow night."

"No," she said.

"Svenson'll kind of look out for you. He told me he'd be glad to."

"Yes," she said.

He held her close for a minute, by the wagon wheel in the lantern light. Then he kissed her. She held up the baby, and Charles tickled a gurgle from him. "Be good, little shaver. Take care of your mother."

He climbed to the wagon seat, picked up the reins and drove away. In a little while she heard a whistled tune growing fainter across the dark prairie. She knew he was whistling to cheer her.

WITH PLANT HUNTERS

THE WHOLE WORLD FILLS YOUR MEDICINE CHEST

by Esca G. Rodger

AT daybreak this morning, a stalwart young Newfoundland fisherman and his partner, clad in oil-skins and rubber boots and sou'westers, were lowering their dory from a two-masted fishing schooner riding at anchor a hundred miles out from the rocky island coast. Twenty more oilskin-clad men were lowering dories, all getting ready to set out for the day's cod fishing. Long weeks from now, the great medicine-manufacturing laboratories of a wholesale drug company, which stretch for six city blocks along beside Detroit's river, will be testing cod liver oil taken from the codfish caught by those early-rising Newfoundland fishermen.

In the fall, when you're thinking of getting yourself in fine shape for football and hockey, a bottle of that clear yellow health-building oil may be on your medicine shelf.

It's unlikely that the Newfoundland cod cares to be made into codfish cakes and cod liver oil. The big fish would probably prefer to go swimming around in the cold green Atlantic, 150 feet below the surface of the water. But he's always hungry, and when he sees a tempting piece of fresh herring down there near him, he grabs it, and then finds out too late that he has grabbed a hook. He is firmly fastened to one of the little short lines that branch off the main part of the trawl line.

Soon the young fisherman and his partner haul in their trawl and throw the greedy cod and his brothers into the bottom of their boat. The men may stand for a moment in the lurching dory, with their rubber-booted feet far apart, looking down proudly on their catch. The cod is a fine-appearing, smooth-skinned fish, with a large head and a tapering tail. Most of those on the trawl line weigh about ten pounds, but an occasional big fellow will weigh thirty or forty pounds.

With satisfied grins, the fishermen rebait and let the trawl down again into the gray-green waters of the Atlantic. Toward night they haul up their lines and row back to the schooner. The other dories are coming in too.

Back on the little ship, the fishermen split and gut the cod they've caught, wash them, and pack them down with salt in the hold of the schooner. But they don't put the livers into the hold. They extract the oil right there on the schooner. The men who fish nearer shore often do the extracting on the home dock. It's a simple process.

They throw the livers into a kettle and run in live steam. The steam breaks up the livers into little particles like sawdust, and in this breaking-up process the cells are ruptured and spill out their oil. Since oil won't mix with water, it floats to the top of the kettle. Then the fishermen skim it off and store it away in a tin-lined barrel.

When the 30-gallon barrel is full, it starts on its long cross-country trip to the laboratories.

Once there, it must be tested. Men in blue overalls roll the barrel off the incoming truck and open it up. A sample goes over to the research laboratories. There scientist workers in white coats try it out. The oil must smell right, taste right, and contain the proper amount of those food

elements known as vitamin A and vitamin D. If the yellow liquid passes every test, it is bottled up or put into capsules. It is ready for the medicine shelf. The Newfoundland fishermen did the preliminary manufacturing, but the laboratory men did the scientific testing that the doctors want done.

A physician recommends cod liver oil to you as protection against colds, for the vitamin A in it increases your resistance. There's plenty of vitamin D in it too, and that builds up strong bones and teeth.

The superintendent of manufacturing at the riverside plant tells how scientists, experimenting, took all the vitamin D out of a rat's food, and all the enamel came off the rat's teeth. Then the scientists put the vitamin back in the food, and the enamel was restored.

No doubt about the value of cod liver oil. But halibut liver oil is a still more powerful product for building up protection against coughs and colds and decayed teeth. One drop of halibut liver oil contains over 100 times as much vitamin A as one drop of cod liver oil, and 20 times as much vitamin D.

Scientists have not known until the last few years how rich halibut liver oil is, nor did they know how to extract it. It was a manufacturing problem. Now a company in Detroit and some scientific laboratories in Chicago have worked it out together, and Pacific coast halibut are providing plenty of oil.

While the stalwart young Newfoundland fisherman is out catching cod, a wiry young fellow over on the Pacific is out in his boat catching halibut.

The halibut isn't any more eager to be caught than the cod. He's a great flat-built fighting fish that weighs any-

where from fifty pounds to four hundred, and he likes it deep down there in the Pacific waters. But when he sees a piece of fresh trout, herring or mackerel right under his nose, he accepts it — and the hook. Then he finds that he doesn't want the hook, and puts up a terrific fight. Even a mere 100-pound halibut can come near upsetting the boat. Finally, however, the wiry young fisherman gets him in. After that comes the triumphant trip back to Seattle or Prince Rupert or Ketchikan.

But the fishermen can't extract this oil themselves. The live-steam process doesn't work. It takes a special solvent to dissolve halibut liver oil. So the wiry young Pacific coast fellow helps pack the halibut livers into tin cans, and then those cans are shipped to the manufacturing laboratories.

Here men open the cans, thaw out the livers, which were frozen for safekeeping, and pour the solvent over them. It dissolves the oil. Then the solvent is evaporated, at low pressure, and leaves the rich halibut liver oil behind in the kettle. It must go through a long period of testing before it is ready to be run into bottles or made into capsules.

The manufacturing laboratories are full of astonishing machines, but the capsule-making machines are almost human. They're so complicated that there's no use in trying to describe them in detail, but they have fingers and thumbs that dip down into melted gelatin and then come up coated. All the little coatings make the tops and bottoms of the kind of capsules that druggists fill with dry powdered medicine like quinine. Of course, these tops and bottoms must be dried and then trimmed to fit, but the machines take care of all that.

The machine that makes liquid capsules can tuck three drops of halibut liver oil into a little shimmering brown globule about the size of a fat garden pea. This is the way it works. A white-coated man puts a sheet of gelatin in a mold, pours on the halibut liver oil, lays on a top sheet of gelatin, and pulls a lever. The machine promptly puts on 60 tons of pressure, and the capsules are made.

II

There's a new little "kapsealing" machine in the plant that is probably the only one of its kind in the world. Its job is to keep oxygen out of capsules filled with digitalis. That's the medicine made from the plant commonly called foxglove. It's a heart tonic, so powerful a drug that it can be used only under the direction of a physician. If oxygen gets into digitalis, it loses its power and some patient may die of heart trouble. So the little kapsealing machine picks up a capsule, and wipes a band of green gelatin around its middle, and seals the capsule cover down tight. No oxygen can get in!

In the "crude herbs" loft at the plant, there are bales of dried digitalis leaves, covered with burlap. One of them makes more than an armful for the husky men who move bales and boxes around up there in that enormous attic place. It's medicine in the bulk!

Clear back in 1785, an English doctor's curiosity gave this valuable medicine to the world. The physician, Dr. William Withering, had heard a great deal of gossip about how an old woman in Shropshire could cure almost any ailment with her herb tea. Why, she had even relieved an Oxford dean who had been just about down and out with dropsy. That herb tea of Old Mother Hutton's could do

anything! Dr. Withering had the curiosity of the born scientist. He hunted up Old Mother Hutton and asked her what was in that herb tea.

But she wasn't telling. That was her secret. Finally, however, after Dr. Withering had slipped some gold in her hand, she recognized him as a fellow physician and scrawled down for him on a scrap of paper a list of the ingredients she put in her famous tea.

The list called for twelve common herbs and plants. Dr. Withering did the necessary research work with each of the twelve — tried out all their value. All the work was done by the twelfth — eleven of them were no good at all medicinally. The twelfth was foxglove — digitalis!

Doctors have been using digitalis ever since. It took over a century, though, to get rid of one big difficulty in its use. Doctors found that extracts made from digitalis leaves varied greatly in strength. Some extracts were too weak to do much good; others were much too strong for safety. For more than 100 years doctors and druggists struggled with the problem of making extracts that were uniform in strength. Finally, Dr. E. M. Houghton, director of the medical research division of a medicine-manufacturing plant, solved the problem.

Before the World War, the company bought its digitalis overseas. Weather-browned English laborers and sturdy German peasants worked away on the hillsides of England and Germany gathering the digitalis leaves that were to be shipped to America. But the war changed things. It took away the men who knew all about harvesting digitalis leaves and curing them for the market. The leaves that reached the big plant by the Detroit River did not reach the standard.

So the scientists decided to raise their own, out on the big 650-acre farm that the company owns, 30 miles from Detroit.

They began in 1923. They planted the first crop of foxglove, and the following year when it flowered they took pollen from a particularly sturdy father plant, carried it over to the blossoms on the stalk of a healthy mother plant, put it in these blossoms and then tied a strong, transparent paper cap over the mother-plant stalk so that no pollen from an inferior plant could get in. They did this with a large number of plants, and from those mother plants they got choice seed to sow for their next crop of heart medicine.

The digitalis plants raised from that carefully bred seed were quite an improvement on the parent plants. There was more of the drug in their leaves, and it was more potent.

This breeding process was repeated again and again, with the scientists getting better plants all the time and learning more about the ways of digitalis.

They found that they could grow digitalis plants seven and one half feet tall — giant foxgloves with beautiful blooms, towering above a man's head. But the giant was just an ordinary plant as far as medicine was concerned. Its leaves didn't yield any better digitalis than those of its humble two-foot-high brothers.

In the end the scientists learned that the best digitalis comes from the leaves of stocky, low-growing plants — bushy rosettes that hug the ground.

They bred these plants themselves. First they found a type of plant that, while it hadn't many leaves, produced digitalis of great strength — digitalis 500 per cent higher

in quality than the United States government requires. Then they crossed this spindly high-quality plant with a stocky plant that, though its yield of digitalis was much less potent, was very bushy with lots of leaves. In this way they got the rosette, with many leaves and plenty of potent digitalis in every leaf.

This is the plant now growing in the fields of the 650-acre farm, and supplying the big manufacturing plant on the river with all the digitalis it needs for its medicines.

There are two crops of digitalis in a summer, two cuttings. After the crop is cut, it is cured in great driers, held at an even temperature. If the air gets too hot under the digitalis leaves, the quality of the drug is lowered. If it gets too cool, the leaves may spoil. In the drying season, there's a man on duty day and night watching those driers.

At last the leaves are properly dried. Then they are baled and wrapped in burlap and brought in to the crude herb lofts. There they're piled up, stored away near ceiling-high stacks of cascara bark from Oregon and Washington, senna pods from Egypt, and ipecac from Brazil, all waiting to be used for the healing of man's aches and pains.

III

Just as important as the medicines from fish livers and plants are those that come from animal glands.

The glands of your body, or of a steer's or a sheep's, are masses of tissues and cells that do a sort of manufacturing business right within themselves. They make medicinal products through the activity of their cells, and scientists have learned how to isolate some of these products — that is, how to get them out of the glands of cattle and hogs.

and sheep and put them up in shape for physicians to use.

Take pepsin. That remedy for digestive troubles comes from cells in the mucous membrane of the hog's stomach. The hog does more than supply spareribs for his country; all the pepsin people use comes from the stomachs of hogs.

Adrenalin is another medicine that is a gland product. Like digitalis, it's a valuable stimulant in cases of heart failure, often saving life.

Adrenalin once helped the police in a Middle West city round up some tough gangsters who were a constant threat to life and property. The gang was on the run. Slipping away. The police got just one man, and had to shoot to get him. When they picked him up, they thought he was dead. A patrolman felt his heart and shook his head.

"Nothing doing, Sarge," he reported. "Guess he's gone."

Well, that gangster wasn't any loss to society except in one way; alive, he might have given the police information that would help them capture the rest of the gang.

"Gone, is he?" grunted the sergeant. "Hard luck."

But somebody knew about adrenalin. A few moments later an ambulance surgeon was injecting a solution of adrenalin right into the gangster's heart muscle, and that apparently dead man came to life! Adrenalin is a circulatory stimulant, and it started that heart muscle to contracting and expanding again — in other words, the man's heart resumed its beat and began sending his blood through his body once more. Soon his eyes opened, and he talked. He lived only three hours — he had been seriously wounded — but in those three hours he gave information that led to the roundup of the gang.

That's the sort of thing adrenalin can do for hearts. But it has less spectacular uses too. Administered to a patient by a physician, it's a big relief in asthma, and again in the troublesome skin disease that bothers people who seem poisoned by some usually innocent food, like strawberries or a certain cereal. It's used, also, on minor wounds to aid blood clotting — a man cuts himself while shaving will pat on adrenalin to stop the bleeding.

Adrenalin comes from the suprarenal glands, two little glands, each shaped like a catcher's mitt, right above the kidneys. Nature puts only a very small quantity into each gland. From 15,000 cattle — 15,000,000 pounds of beef — you can get only a pound of adrenalin. One large drug manufacturer uses the glands from hundreds of thousands of cattle.

Out on the plains of the far West and down in the great grazing lands of South America, sombreroed cowboys on swiftly wheeling horses are rounding up the cattle, bringing in both meat and medicine on the hoof.

IV

In the research laboratories, scientists are always studying new problems in medicine making. Any need for a more effective remedy is sure to start a search for it.

Several summers ago, black-headed, seventeen-year-old Jim Smith, the champion diver in the constantly shifting population of a lakeside camp, ran out on the diving board to do a jackknife, and his bare feet picked up a fungus infection called "ringworm." He began to be annoyed with intense itching and burning between the toes. Then that fall, towheaded John Jones, Blackstone College's star

halfback, went with the team to play a game away from home, and in the hotel neglected to slide his feet into slippers before he went in to take a bath. And he picked up "ringworm."

With boys and their families all over the country getting this annoying infection, the medicine-manufacturing companies went to work to find the best possible thing for its relief and cure. The director of the research laboratories of a wholesale drug house asked a woman scientist to find something exceptionally good for the purpose, and it took her two years to work out the problem.

First she went to a physician in the city who specializes in skin diseases and got him to supply her with scraps and scabs from the infected skin of his patients. This material was full of the tiny plant organisms known as fungi, the very minute living things that cause the skin disease.

Then she went back to her spotless, airy laboratory and slipped on her white uniform and went to work. She dropped the fungi-infested scraps and scabs into test tubes about half filled with jellylike agar made from seaweed. The fungi lived well on the agar and multiplied rapidly. Soon she had plenty to use in her experiments.

She knew that to relieve and cure "ringworm" she must do one of two things. Either find a substance that would kill the fungi in the skin tissue, or find something that would cause a softening of the skin and induce it to slough off, carrying the fungi with it.

Since she had to watch the fungi in action, she planted them in guinea pigs. She was going to give the guinea pigs "ringworm" and then cure them. She made two lesions or sores on each pig's back. One lesion she could

treat with the curative substance she was trying out, and the other she would leave alone. Then she could see how much good the substance did.

She worked for weeks trying out single substances. But each was ineffective. Perhaps one substance alone wouldn't do the job. She began trying combinations of different substances. Month after month she kept at it, combining different chemicals in an effort to find an effective and soothing ointment. Each combination was tried out on the guinea pigs. And at last she was successful. That one job was done!

By everlasting pegging away at the job, year after year, scientists in their laboratories have relieved an almost unbelievable amount of the suffering men had to endure in earlier days.

In the Middle Ages, great epidemics of Asiatic cholera, bubonic plague, and "black diphtheria" repeatedly swept through Europe. One of these epidemics frequently wiped out from 15 to 20 per cent of the population. Some records say that occasionally two-thirds of the people in a city died. Now such epidemics are almost unknown.

In 1796, London was scourged by smallpox, and 3500 died. But a young English physician, Dr. Edward Jenner, in the sleepy little village of Berkeley, a hundred miles away, was even then working out a way to conquer smallpox. He found it that very year, and a Berkeley boy, James Phipps, had courage enough to help him find it.

On May 14, 1796, there in the little Gloucestershire village, Dr. Jenner gave James Phipps the world's first vaccination. In six weeks the boy exposed himself to the dreaded disease but, just as Dr. Jenner had expected, he

remained perfectly well. Dr. Jenner's discovery had made the boy immune!

At first men ridiculed the young physician. But eventually long lines of people waited in front of his door and begged him to vaccinate them. They knew, as we know today, that Dr. Jenner had found a safeguard against smallpox. Today the disease, like the once greatly dreaded diphtheria, is well under control.

Another preventive medicine, the vaccine used to ward off typhoid fever, has been given us by the research workers. In times past, typhoid was the dread of an army. In 1898, during the Spanish-American War one soldier out of every seven contracted the disease, and one out of every seventy-one died from it. But during the World War, all soldiers were vaccinated with the antityphoid vaccine. With millions of these men living under conditions highly conducive to typhoid fever, only one out of every 3,000 contracted the disease, and only one out of every 25,000 died from it.

Still another preventive medicine that saved many lives in the World War is the antitoxin for tetanus or lockjaw. Jim Smith's brother can tell you something about that. He was hustling around the family workshop in a pair of old soft shoes and ran a rusty nail into his foot. He had the good sense to go straight to the family doctor, and that World War veteran promptly gave him tetanus antitoxin, and the nail wound healed at once. The doctor also gave him some information about the tough microbe that causes lockjaw.

The scientist Nicolaier found the microbe, in the dirt of a wound, in 1885. He called it the tetanus bacillus and did a lot of experimental work with it. He found that the

bacillus produced a spore so resistant that it withstood boiling for some minutes, and remained alive in the soil for months.

Four years later, the scientists discovered an antitoxin that would defeat the hard-boiled microbe.

The World War veteran told Jim's brother that the use of this tetanus antitoxin had given thousands of young fellows a chance to come back home instead of dying of lockjaw over in France, and Europe.

In days past a person bitten by a mad dog faced practically certain death from hydrophobia. Then in 1885 Pasteur completed an undertaking now famous. He finished working out an antirabic treatment that prevented hydrophobia! That very year four American boys who had been bitten by a mad dog were rushed overseas to Pasteur's laboratory in Paris—and every boy was saved.

At that time the victim had to go to Pasteur in Paris. Now modern production and distribution methods have placed antirabic vaccine within reach of every physician's telephone. Many city and state health departments have it on hand. Manufacturers will rush it to any point at which it is needed.

. . . It takes an army to stock the medicine shelf for you and your doctor. Industry on the march, with science at its elbow. Physicians, pharmacists, botanists, chemical engineers, research men of all kinds, work shoulder to shoulder with the old-timers of the factory shops. They search the world for the medicines that will keep you healthy, and they like the job.



HUNTERS WHO SEARCH FOR NEW PLANTS

by Herbert W. Waring

TO begin with, I want to tell you the story of twelve little immigrants — plants — that found their way into the United States, partly by chance and partly by the encouragement of the Federal Government.

In 1869, when the late William Saunders was the horticulturist of the United States Department of Agriculture, a friend called at his office in Washington with a letter from a correspondent in Bahia, Brazil. This letter told of a fruit that was greatly relished there by both natives and foreigners — an orange of unusual characteristics, large in size, delicious in flavor, *without seeds, with a navel.*

Might not this orange prove of value in the United States? The American horticulturist forthwith wrote to the man in Bahia, telling him he would be glad to receive a few small trees propagated from the trees that bore this unusual fruit.

The little grafted trees arrived in Washington — twelve of them. Twelve apostles of an amazing prosperity!

They were splendid specimens. Planted in the Government greenhouse, ten of them flourished, yielding buds and scions which were inserted in other orange stocks. As the budded or grafted trees developed, they were distributed to orange growers and horticultural experimenters. Some went to Florida, but they didn't do well there, although other oranges flourished in the same climate and soil.

In 1873 Mrs. Eliza Tibbets, then residing in Wash-

ton, was starting for her new home in the recently established irrigated settlement at Riverside, California. She appealed to the government horticulturist for trees of the new variety, and two little trees, themselves sprung from buds of the original "apostles," were sent by mail to Riverside. In a few years they fruited. This fruit was large in size, handsome in appearance, and luscious in flavor.

The news spread abroad, the orange growers came, and they were astonished, both by the quality of the fruit and the quantities of it on those two little trees.

Mrs. Tibbets permitted them to cut from the little trees scions and buds with which to "top work" their orchards and so convert their trees into bearers of the navel orange.

From Mrs. Tibbets' trees the navel orange industry of California has developed. And the famous Bahia orange, later known as the Riverside Navel and now as the Washington Navel, together with the Valencia, makes it possible for the California growers to send east trainloads of oranges every week in the year.

If a single variety of one fruit, heard of by chance and introduced in this fashion, produced such marvelous results, can you imagine what the result would be if a systematic, scientific search were made throughout the world for seeds and plants that might prove useful in the United States? Such a search *is* being made today. It has been going on for a quarter of a century. Government explorers are scouting in the agricultural regions of China, Manchuria, and Japan, in Russia and along the Mediterranean, in Algeria, Tunis, and Abyssinia, in India and the East Indies, and in the South Seas, in Siam, Assam, Burma and Bengal!

It's an amazing story, this story of a million immigrants. For the introduction of scores of thousands of varieties of seeds and plants, new luscious fruits, improved grains, new vegetables, new grasses, new trees, involves nothing less than the remaking of a nation's agriculture.

During the last twenty-five years, since the systematic importation and trial of foreign plants was undertaken by the Bureau of Plant Industry of the United States Department of Agriculture, more than 69,000 lots of seeds, cuttings, bulbs, tubers, and plants have been brought in. A "lot" may mean nothing more bulky than a teaspoonful of Sudan grass seed, which came in in 1909 and which, in 1926, produced in our South a seed crop amounting to 11,000,000 pounds! On the other hand, a lot may consist of a ton of durum wheat, a bale of rooted trees, a carload of bamboo clumps.

Every day to the receiving office of this Bureau comes something new. Seed of the calabash pipe gourd from southern Africa. A little bundle of two or three scions of the jujube from China, carefully wrapped in waxed paper, moss and burlap. A hundred pounds of soy beans from Manchuria. Fifty pounds of barley from Abyssinia. Scions of the mango tree from India, or date suckers from Egypt.

In Bengal grows the chaulmoogra tree, the fruit of which contains seed that produces an oil now known to be a specific for leprosy. Today, we are growing it in the Philippines and in the Canal Zone. One of the most rapidly growing trees in the world is the Chinese elm. Handsome as a shade tree, it is capable of withstanding drought, and is now flourishing in arid parts of the West. The tung tree! A native of China, ornamental and

showy, it produces a fruit with seven large seeds which contain an oil used as a drier in the paint and varnish industry. In 1925, American businessmen imported over a million pounds of tung oil from the Orient, but before long we shall produce it in large quantities ourselves. As an immigrant, the tung tree arrived in 1905, and it is now being planted commercially in the South and Southwest. Last year a total of 1,500 acres of young tung trees was in cultivation.

The taro and the yautia, starchy root crops which came to us from Hawaii, are now growing in the South. The dasheen is an immigrant from Central America. Like a potato, but richer, more mealy, with fuller flavor, it is now in production on a commercial scale and may soon be a commonplace in our northern markets. The chayote is a pear-shaped, vegetable fruit of the same family as the cucumber, resembling in taste the summer squash or the vegetable marrow, but more delicate. A native of our western tropics, it is taking out naturalization papers in South Carolina, eastern Texas, and southern California.

What does this kind of work mean to us individually? What does it mean to the future of our country? These are questions that I asked Dr. William A. Taylor, the celebrated pomologist, who, for seventeen years as chief of the Bureau of Plant Industry, has directed the activities of our explorers and plant experimenters.

"Bear in mind," was his response, "that we have no native grains of importance, with the exception of corn, the Indian maize, and no native fruits of importance except the plums of the upper Mississippi valley, blackberries, raspberries, and strawberries. And our strawberries in their present form came from Europe."

"Few of us realize that the crops on which we mainly rely have come to us from other countries. To help find the plant, the fruit, the nut or timber tree, the grains and grasses, that will produce the best results on every acre of land in the United States is the business of our plant introduction office.

"*Finding* the seed or plant of a desired species and bringing it into the country is only the first step. Usually, a long line of experiments must follow. Plants must be bred, grains crossed; fruits must be grafted on new stock. Undesirable traits must be eliminated, desired ones developed.

"Along with these plants, as a result of haphazard methods of introduction in the past, have come native diseases. And here in the United States, through the enormous scale on which we plant crops of most kinds, we have afforded opportunity for the increase of these pests.

"We have developed various ways of protecting our crops from diseases. But we shall never have our country *in a rock-bottom safe agricultural position until we have varieties and strains that are adequately resistant to disease, adapted to the sections where they are grown, and yielding a product suitable for our needs.*

"If you lived in New England, in Virginia, or in the Appalachians farther south, you would know what has recently happened to our native chestnuts. A parasitic fungus, the so-called blight or bark disease, brought into the United States from Asia on small trees imported by private nurseries, has wrought destruction. All our native chestnuts are susceptible to it. It is spreading south. You see these blighted trees standing tall, gaunt, somber

—dead! Within twenty years all our native stands will be infected. Shortly after that they will be gone.

“For many years the tanning industry has depended largely upon tannin obtained from chestnut wood. The War Department is likewise concerned because of its great need for leather.

“In China, there are numerous species and varieties of chestnut. Some are affected by the same parasitic fungus that kills our own. But there is one, the so-called Chinese hairy chestnut, which is *highly* resistant. In this we see great promise. By crossing it with other strains, we believe that, in time, we shall be able to produce a new chestnut which will resist the blight, produce good nuts, and be a good timber tree with a tall, straight trunk.

“Perhaps you already know the remarkable story of durum wheat.

“Years ago immigrants from Russia brought to Kansas the seed of certain hard wheats in which several manufacturers of cereals saw a possible future. One of our explorers made a trip through Russia and the Mediterranean region to see what he could find. He brought back many strains of durum wheat. An unusually hard type, with a high proteid content, this is the macaroni wheat of the world, though the common wheats are more satisfactory for bread.

“In all, the Government spent approximately \$400,000 experimenting with the seeds of hard wheats that resulted from the exploring expedition; and the result is the durum wheat which is now grown in this country. Not only is it strongly resistant to the disease known as black stem rust, but it also holds its own against drought. In comparatively few years, the crop of this wheat has mounted

to 30,000,000 bushels a year! *In other words, the varieties of durum wheat acquired by exploration and subsequent breeding produce annually more than a hundred times the entire amount spent in obtaining them.*

"In the Orient, the soy bean is the great leguminous crop; whereas we in this country have relied upon clover and alfalfa. Like clover, the soy bean pulls nitrogen out of the air and eventually deposits it in the soil. A good forage, it makes splendid hay when cured. Soy bean meal is now extensively used in the United States in the preparation of health foods. It makes good muffins. The oil from the bean is used on a large scale by the paint industry as a supplement to linseed oil in the lower-priced paints. The cake made from the beans after extraction of the oil is valuable as feed.

"Already, in the United States, scores of thousands of acres have been planted to soy beans. It is evident that it is to become one of our main forage crops.

"In China there grows a fruit tree known as the jujube. You may never have heard of it, yet, to more than 400,000,000 Chinese, this fruit, sometimes known as the Chinese date, is as important as the fig is to the peoples of the Mediterranean.

"For twenty years we have been working with the jujube in this country, and during the past five we have had most encouraging results. It gives indication of establishing a new industry in the Southwest and in California. Perhaps in less than fifteen years you will be asking your fruit dealer for jujubes as you now ask for figs or dates.

"It has been said that if the Oriental timber bamboo produced seeds oftener than once in forty years, it would long ago have become a valuable and useful crop in our

South. The fact that it has had to be brought over in the form of living plants, requiring special handling and treatment, has prevented this development. However, a beginning has been made.

"We have groves of bamboos in Florida and at Chico, California. Our search is still going on in different parts of the Orient for species of bamboo that may be especially adapted to our climate; and some, brought from Java, are particularly promising.

"There is no plant in the world that can be put to so many uses as the bamboo plant. To the Orient it has been what the white pine has been to us. Wherever it grows, it has become the most indispensable of plants. They use the bamboo in the Orient for making baskets, street brushes, and brooms. It makes beautiful bridges; they even make houses of it. The shoots are a staple of their diet.

"In this country we are importing hundreds of thousands of bamboo fishing rods every year. We also use it in making phonograph needles. It has been predicted that if bamboo production can be put upon a commercial scale in this country, it will be used for barrel hoops, for vine stakes and trellises, for light ladders, for stays for overloaded fruit trees, for baskets, and for light fruit shipping crates. For light furniture it is sure to find a market. It may eventually be used in papermaking. And, of course, we shall eat it when we can get it.

"Do you wonder that some observers have said that the bamboo is one of the most promising of all the plant immigrants that have ever found their way into the United States?"

WITH CAMERA MEN

FILMING AN AIR FIGHT

by Dick Grace

MOST fliers have worn parachutes, and some have had to use them, in emergencies, but I doubt whether any pilot has received more of a thrill from a parachute than Bob King.

It happened during the filming of the last scenes of the movie "Lilac Time." I had two squadrons, the English squadron of seven planes and the German squadron of nine, and to photograph the clash between the two units we used three camera ships. That made a total of nineteen planes in the air for the mix-up.

Orders were for everyone to wear parachutes, as a protection against collision, and very few objected to the precaution. With nineteen ships whirring and buzzing, spinning and looping, all within a very small area, the slightest error in judgment might cause a collision.

The chutes we were wearing were of two kinds — the seat pack, the one which was used as a cushion when we were in the cockpit, and the back pack which, as the name signifies, was strapped to the back. We didn't care a lot for the back pack, since it rubbed uncomfortably on the upholstery of the cockpit and held one's body away from the rear of the chair.

On a last inspection before we took the air I noticed that Bob King was wearing one of these back packs — and

Bob was flying one of the camera ships. He, above all others, should have had a seat pack, because it afforded greater comfort and gave greater visibility to the pilot. But evidently it was of his own choice; so I climbed into my ship, gave the signal, and we were off.

Nineteen ships off and up into the dense clouds! For minutes we climbed through that bucket of milk, and then, suddenly, we found ourselves sitting on top of another world. Below us was a swirling angry mass of twisting mist; above, nothing but the blue sky and the sun. With a wiggle of my ailerons I signaled the German squadron to turn downwind, while we continued upwind. It was all prearranged that we should each fly in these directions for two minutes and then turn and approach for the dog fight.

Another nod of the nose of my ship and the camera planes started climbing, to be in a position to photograph the scrap.

But that particular shot was never to be photographed. Barely had I given the last signal when I noticed the ship Bob King was flying dip dangerously from its course. Something was wrong — those three camera planes were to hold to true steady flight.

I watched it closely and noticed with some alarm that it was flying wing low and had assumed the position of a sharp glide. Instantly I knew that something of a serious nature had developed. Bob didn't ordinarily fly like that. A thousand thoughts raced through my brain: Bob was ill — his controls had jammed — a wire had parted. Any one of a dozen things might have happened.

But this was no time to be merely wondering. I rolled my ailerons — a sign for my squadron to disband — and

jammed the throttle of my ship completely forward. In a sharp dive I caught up to him quickly, and when I did I got the shock of my life. The actuality was worse than any of my speculations.

To my horror I saw his white parachute slowly fluttering out in the wind. Bob King was trying desperately to gather it in, at the same time trying to control his ship. Apparently the snaps had given away on the back pack, allowing it to open and fill, in the draft of the propeller.

Hopeless! It would be but a matter of seconds before Bob would be dragged from the cockpit and, if he were lucky enough to clear the controls, be yanked out into space. Then the ship, with no one at the controls, would plunge thousands of feet to the earth below and crash to bits. The cameraman and the plane were doomed. The cameraman couldn't fly the ship. And there was only a slim chance that the chute would not catch in the rear fins, dragging Bob down with it on its fatal dive.

Desperately he fought to gain headway, but it seemed that as soon as he got part of the cloth in, the wind would whip out a new section. Now he was only a few hundred feet above the clouds, and I knew that once he went into that swirling mass in such a dilemma, it would be all over.

Helpless to aid, I could only watch and pray. I could see the look on the cameraman's face, and I knew that he realized the danger he was in. He knew that Bob King was fighting desperately for both their lives—that if Bob lost his scrap against wind and billowing silk, his own life was lost.

Bob seemed to arrive at a sudden decision. Bringing the nose of the ship up, he turned almost completely around in his seat and let the stick go. Then with both

hands he gathered in the fast-billowing chute. It took just two good yanks of his strong arms and the thing was in the seat — all unpacked, but where it could do no harm. It was all over — over in a second, but in the air a split second is enough to make or break a man.

Undoubtedly if he hadn't made the right decision *when he did*, two men would have been killed and a ship lost. "That's one on me!" he said, after we had dived through the clouds and landed.

"No," I said, "that was *almost* one on you!"



WALT DISNEY MAKES A MICKEY MOUSE FILM *(adapted)*

MICKEY MOUSE is an all-round actor. He can sing, whistle, or talk. Everything he does is in tune with a musical note. Mickey's creator, Walt Disney, supplies Mickey's voice, while Marcelita Garner utters the mouselike, yet human voice when Mickey's sweetheart, Minnie, talks. A man who was a barker in a circus for many years supplies most of the other sounds made by Mickey's animal assistants.

Walt Disney plans every adventure of Mickey with great detail. At the outset of a new adventure, Walt meets with his staff of artists and engineers. As these men suggest ideas, a secretary makes an outline of the story. In writing this story Disney's helpers decide upon the kind of adventure Mickey is to make, the kind of villain who will try to outwit Mickey. Next, the directors decide whether

Mickey's sweetheart, Minnie Mouse, is to be kidnaped and carried to a castle high in the mountains or lured to a penthouse on top of a high apartment house in a crowded city. The directors also select the plan used by Mickey in rescuing his sweetheart.

The plot worked out by these studio artists is always the same. First, there is the hero about whom the story is told. Second, there is a villain, an old-fashioned kind with long whiskers, who is in love with Mickey's sweetheart, Minnie. In the beginning of every adventure the villain gets the best of the hero; and in the end, the hero outwits the villain and rescues the frightened young lady. The hero usually receives a kiss as his reward. Third, there is always a stooge—someone who plays into the hands of the hero in his efforts to outwit the villain. Usually Pluto, the Pup, or Minnie gives Mickey a chance to show what a real hero is.

At these meetings of the staff, the musical director is present. After he has heard the story worked out in all its details, he suggests the musical theme for the sound movie. He always selects a musical note to illustrate Mickey's feelings at the time that he is working out his problem of rescuing his sweetheart. When Mickey is in fine spirits on his way to Minnie's home, he skips along to the tune of pleasant musical notes. When he is about to give up hope of defeating the villain, the musical note that describes his feelings is slow and sad. The musical note is always the same as Mickey's feelings.

After the work of the editors has been completed, the artist or animator steps into the production. The screen story or scenario is divided into many scenes and divided

among the artists who will draw the pictures which appear on the screen. When each animator receives his part of the story, he is given two sheets of instructions. The first is an account of what the actors are expected to do in each scene. The second is an exposure sheet on which are written the musical notes which are to accompany the actions of the actors in each scene. From these two sets of instructions the artist is directed how to combine the action and the musical sound which goes with it into the rest of the film story.

As the artists complete their animations, their drawings are sent to another set of workers who trace the pictures on transparent celluloid sheets. Another group of workers paint these sheets in the colors which you see reflected on the movie screen. While the action pictures are being drawn, other artists are preparing the background of the action on long strips of celluloid. Finally these strips are sent to a photographer who places the picture of the actor against the long strip of background scenery. In this way the action of the character is made to fit into the background of the stage setting. For example, if Mickey is running along a country road, he is seen passing trees, fences, and animals. On the screen these things appear together. In the process of production, one artist draws the scenery, and another draws the action of Mickey or some other actor in the film.

When the animators or artists finish drawing the thousands of small pictures on a film of celluloid, the film is run through a movie machine at the rate of twenty-four frames per second. Since Mickey Mouse cartoons always require seven minutes to run through the moving picture machine, it is easy for a student in arithmetic to figure out

the number of small frames of celluloid the artists have drawn in order to get a complete picture.

Why did Walt Disney select Mickey Mouse for his Hero?

Mickey Mouse was a friend of Walt's long before Walt put him into the animated movies. This is said to be the way it happened.

In 1920, Walt Disney was a poor artist working in a commercial art studio in a Middle Western city. Sometimes his job required that he work late at night. Along toward midnight when everything became quiet, Walt would hear scratching in the metal wastebasket into which the employees of the office tossed discarded lunch boxes. Mice were searching for their evening meal. Most men would have chased the little fellows from their feast of crumbs, but not Walt Disney. He showed an interest in the little animals. He coaxed them from their hiding places with fresh crumbs. Soon he had tamed a number of them, and had them living comfortably in a cage. One of his captives became so friendly that Disney allowed him to run about on the top of his desk while he worked on his drawings of advertisements. This mouse became Walt's favorite. (If it is possible to trace the growth of the Mickey Mouse idea in Disney's mind, it is possible to say that this little tame mouse was the original Mickey of the movies.) Gradually Disney thought of his pet mouse and his mouse associates as humans.

The idea of a series of Mickey Mouse adventures grew in his mind. Then, while traveling from New York to California, Disney decided to put Mickey into an animated moving picture. With his brother, Roy, as his first

assistant, Walt wrote his first Mickey Mouse story and drew fifteen hundred different pictures to illustrate it.

The public liked the idea: Mickey was in the movies.

II

Mickey made his debut in the Colony Theater in New York on September 28, 1928. His first role was entitled *Steamboat Willie*. His audience had seen animated cartoons before Mickey's time, but when Mickey played a xylophone solo on a cow's teeth and played an orchestral number on a set of dishpans, his audience knew that a new movie hero had appeared. The audience went wild with laughter, and the next day fan mail arrived at the studio for Mr. Mickey Mouse.

Every time his picture was shown this young star gained new friends. He was a child star, and Americans have always been happy to give warm reception to another Jackie Cooper or Shirley Temple. Mickey was a youngster but, unlike other young celebrities, great preparation had been made to give him the right type of introduction. For many months Walter Disney, Mickey's creator, and Mrs. Disney planned for Mickey's first appearance. The screen story or scenario was written by the Disneys during a train journey from New York to Hollywood. When the first drawings of Mickey had been completed, they were guarded every minute against kidnapers of a Hollywood type. For Walt Disney had had a sad experience with these men who steal brain-children from their parents. Several years before Walt had introduced another animal actor, Oswald the Rabbit. Like Mickey's first reception Oswald's was also a great success. The moving-picture audience enjoyed the antics of the char-

acters made famous by Aesop many centuries before modern times. The success of Oswald did not benefit his creator, however. For after Disney had made a number of Oswald films, he asked for an increase in salary. His employers refused his request and employed men on Disney's staff to make Oswald films at a lower price. Walt remembered this experience when he planned to present Mickey. The mouse must be different; he must grow up in everything but his voice. Thus, to protect Mickey against kidnapers, Walt Disney has never allowed anyone else to speak for Mickey; Walt was Mickey and his voice must always be the same. During the past five years Mickey has grown in his ability to act. He has a special technique. When he was a youngster just getting a start, he was permitted to do and to say almost anything. He was a child. However, as he grew up he had to behave in a different manner. Walt Disney insisted that Mickey should always be a gentleman. He should never act in a cruel way unless he was punishing a villain. If he acted conceited and vain, he must be humbled for his actions. He must never be a smart aleck. In every action he must be natural.

While the young actor was growing up, he was extending his circle of friends around the world. Douglas Fairbanks introduced Mickey to the African headhunters, and they liked the little fellow. Tribesmen in South Africa demanded his likeness on the cakes of soap they accepted in trade for their ivory and animal hides. On his fifth birthday his creator was made an honorary French citizen. Theaters in Sweden run seven or eight Mickey Mouse films for an evening's performance. Children in Japan see Mickey on the screen as Miki Kuchi, French

children as Michel Souris, Spaniards as Miguel Ratoncito, and Germans as Mickey Maus. In all the countries where Mickey appeared last year, almost four hundred and seventy million people paid to see him outwit the hard-hearted villain and save his sweetheart.

Not only has Mickey been a screen success, he has invaded the field of business. Millions of Mickey Mouse watches, watch fobs, alarm clocks, picture books, and other trinkets have been sold. Mickey is one of America's greatest business successes.

* * *

NOTE: The ideas for this short article on Mickey Mouse are based upon two long articles appearing in the following magazines: Part I is told in full in Andrew Bone's article, *When Mickey Mouse Speaks*, which appeared in the March, 1933, issue of the *Scientific American*. Part II is a part of the article by Alva Johnson entitled *Mickey Mouse*. It appeared in the July, 1934, issue of *The Woman's Home Companion*. If you are interested in reading these articles written especially for older readers, consult your school librarian.



WITH AMERICAN PIONEERS

FIGHTING FOR A FOOTHOLD IN THE WILDERNESS

by Judge William Cooper

IN 1775 I visited the rough and hilly country of Otsego, where there existed not an inhabitant, nor any trace of a road. I was alone, three hundred miles from home, without bread, meat, or food of any kind. Fire and fishing tackle were my only means of subsistence. I caught trout in the brook, and roasted them on the ashes. My horse fed on the grass that grew by the edge of the waters. I laid me down to sleep in my watch-coat, nothing but the melancholy wilderness around me. In this way I explored the country, formed my plans of future settlement, and meditated upon the spot where a place of trade or a village should afterwards be established.

In May, 1786, I opened the sales of 40,000 acres, which, in sixteen days, were all taken up by the poorest order of men. I soon after established a store, and went to live among them, and continued to do so until 1790, when I brought on my family. For the ensuing four years the scarcity of provisions was a serious calamity. The country was mountainous; there were neither roads nor bridges.

But the greatest discouragement was in the extreme poverty of the people. None of them had the means of clearing more than a small spot in the midst of the thick and lofty woods, so that their grain grew chiefly in the

shade. Their maize did not ripen; their wheat was blasted, and the little they did gather they had no mill to grind within twenty miles' distance. Not one in twenty had a horse, and the way lay through rapid streams, across swamps, or over bogs. They had neither provisions, nor money to purchase them; nor if they had, were any to be found on the way. If the father of a family went abroad to labor for bread, it cost him three times its value before he could bring it home, and all the business on his farm stood still till his return.

I resided among them, and saw too clearly how bad their condition was. I erected a storehouse, and during each winter filled it with large quantities of grain, purchased in distant places. I procured from my friend Henry Drinker a credit for a large quantity of sugar kettles. He also lent me some potash kettles, which we conveyed as we best could; sometimes by partial roads on sleighs, and sometimes over ice. By this means I established potash works among the settlers, and made them debtor for their bread and laboring utensils. I also gave them credit for their maple sugar and potash, at a price that would bear transportation, and the first year after the adoption of this plan I collected in one mass forty-three hogsheads of sugar, and three hundred barrels of pot and pearl ash, worth about nine thousand dollars. This kept the people together and at home, and the country soon assumed a new face.

I had not funds of my own sufficient for the opening of new roads. But I collected the people at convenient seasons, and by joint efforts we were able to throw bridges over the deep streams, and to make, in the cheapest manner, such roads as suited our humble purposes.

In the winter preceding the summer of 1789, grain rose in Albany to a price before unknown. The demand swept the whole granaries of the Mohawk country. The number of beginners who depended upon it for their bread greatly aggravated the evil. A famine ensued, which will never be forgotten by those who, though now in the enjoyment of ease and comfort, were then afflicted with the cruellest of wants.

In the month of April I arrived amongst them with several loads of provisions, destined for my own use. In a few days all was gone, and there remained not one pound of salt meat nor a single biscuit. Many were reduced to such distress, as to live upon the roots of wild leeks, wild onions; some more fortunate lived upon milk, whilst others supported nature by drinking a syrup made of maple sugar and water. The quantity of leeks they ate had such an effect upon their breath, that they could be smelted at many paces' distance, and when they came together, it was like cattle that had pastured in a garlic field. A man named Beets, mistaking some poisonous herb for a leek, ate it, and died in consequence. Judge of my feelings at this epoch, with two hundred families about me, and not a morsel of bread.

A singular event seemed sent by a good Providence to our relief; it was reported to me that unusual shoals of fish were seen moving in the clear waters of the Susquehanna. I went and was surprised to find that they were herrings. We made something like a small net, by the interweaving of twigs. By this rude and simple contrivance, we were able to take them in thousands. In less than ten days each family had an ample supply with plenty of salt. I also obtained from the Legislature, then

in session, seventeen hundred bushels of corn. This we packed on horses' backs, and on our arrival made a distribution among the families, in proportion to the number of individuals of which each was composed.



A PIONEER BOY REMEMBERS

by Wayman Hogue

I

THE OZARK CABIN

THERE is nothing I remember more vividly than our old home and its surroundings. I remember the "big house," one large room built of scalped logs, chinked and daubed, and floored with puncheons made of split logs with the flat side up and the surface hewn smooth. It was roofed with boards riven from choice oak and had overhead joists made of unbarked poles five or six inches in diameter.

There was no loft or ceiling but some long boards were placed across the joists on which were stored baskets of apples, bags of peanuts and sacks of cotton. I also remember how, in the fall of the year, my mother would slice pumpkins in rings and string them on a stick to dry. These sticks containing rings of pumpkins extending from one joist to another were a familiar sight.

There were two doors in the big house, one on each side, called the front door and the back door. There were no windows, and all the light and ventilation came from

the open doors and the unceiled cracks in the walls between the logs.

Best of all I remember the huge fireplace at one end of the big house. This fireplace was made of stone quarried from a near-by hillside and cemented together with a cement made of clay. The extending chimney was built of split sticks heavily daubed and lined with clay, which when dry was very substantial. Sometimes this lining would crack and fall off, leaving the wood parts exposed, and when the weather was cold and the fires large, my father would have to throw water up the chimney to extinguish the blaze.

The doorsteps were made of three sawed blocks which stood on end, one above the other.

I still remember the kitchen, a smaller house of one room that stood out in the yard, facing the back door of the big house, and connected with the big house by a hewn log that was used as a walk from one house to the other.

In the kitchen there was a small fireplace, on the side of which were skillets and lids, a teakettle, a coffeepot, boiling pot, a fire shovel, a pair of tongs, and a pair of pot-hooks, either resting against the walls or hanging suspended from nails or pegs driven into the walls. There was a stationary bench made against the wall on one side of the dining table. The other seats at the table were supplied with chairs brought from the big house at meal times.

The loom, when not in use, stood in the back part of the kitchen, and on it reposed two or three pairs of batting cards. The coffee mill was fastened to the wall, and the churn occupied space on the hearth near the fireplace.

Against the jambs, strings of red pepper, small bags of

garden sage and hands of tobacco were sometimes suspended. Near the door there was a shelf attached to the wall on which rested — in addition to a can of homemade lye soap, a jar of salt and a jar of lard — a cedar water bucket with a gourd dipper hanging on a nail just over it. Under the shelf was a barrel containing meal with a meal sack spread over it to keep out the dust.

Just outside the kitchen door and against the wall was a small bench on which there was another cedar water bucket, a tin wash pan, a sardine box filled with lye soap. Hanging over the basin was a towel made from a worn-out meal sack.

The entire family slept in the big house. There were three large cord beds, two in the back part of the house — one in each corner — and the third in a corner next to the fireplace. In place of slats there were ropes running through and around the railings and woven tight. On this network of ropes rested the beds. First there was a straw mattress and on this a full heavy feather bed.

My father and mother slept on one of the beds in the back of the house and my sisters on the other, and Jim and I slept on the bed near the fireplace. We also had a trundle bed under one of the large beds, which could be drawn out and used for company. My mother could always take care of still more company by making down a feather bed in the middle of the floor.

The spinning wheel, when not in use, usually stood by the wall, and there was a large old trunk placed back between the beds, which was used for storing quilts and clothing.

A heavy board was built over the fireplace, which was used as a mantel. On this usually could be seen a large

Seth Thomas clock, bottles containing castor oil, turpentine and camphor, and a cake of mutton suet.

Over each door were two forked sticks nailed to the wall with prongs extending outward, called gun racks. A rifle rested on one pair of these gun racks and a shotgun on the other. There was a shot pouch hanging suspended to each of the racks.

We had no rockers and all our straight-backed chairs were bottomed bark, white oak splits, corn shucks or cowhide.

Our library consisted of a Bible, a small but very thick hymn book, a dream book, a letter writer and an almanac.

The usual way of lighting our house by night was with pine. The heart of the seasoned pine, when split into strips, made a splendid torch, and the knots of decayed pine were very rich in rosin. A pine knot thrown into the fire lighted the whole room. Sometimes, when out of pine knots, we used candles which we molded ourselves. I also remember seeing my mother put sycamore balls in a saucer of grease and light the end of the stem. This made a dim flickering light.

A small rail fence enclosed our yard. It was also well protected by two large and faithful dogs, "Watch" and "Savage." Off by itself in the yard was the smokehouse, where meat was hung and smoke-cured.

A short distance from the yard-fence was the barn, usually called the "crib and stable." The lower part of the crib was used for storing corn, and the upper part, called the fodder loft, was used for storing unthreshed oats, fodder and hay. On one side of the crib was a stall in which we housed our horse and mule, and on the other side was

a storage for wheat, tobacco, dry hides and baskets of wool.

The crib and stable were surrounded by a heavy rail fence staked and ridered, and we referred to this enclosure as "the lot." Adjoining the lot was the cow pen. We had no shelter for the cattle, sheep and hogs, and they were forced to take the weather as it came.

The outside walls of the crib and stable were often adorned with the skins of wild animals, such as deer, wild-cat, and sometimes bear. The walls of the smokehouse were ornamented with skins of fur-bearing animals such as raccoon, fox, mink and skunk, where my father had tacked them up to dry. The skins of an otter and a beaver, stretched over a board with the pelt side out, were a familiar sight.

Our vegetable garden was on the side of the house opposite the lot, and it was protected by a fence made of long, sharp-pointed pickets called palings. The palings were pointed at the top to prevent chickens from flying over into the garden, and they were set close together at the bottom to keep out rabbits and fowl.

Our house was built with respect to convenience to water. About a hundred yards from the house was a large spring with a swift outflow from which we obtained our household water. A few feet from the mouth of the spring was a small excavation through which cold water ran, and in it were placed buckets and jars of milk in order that they might keep cool. They were protected from hogs and cattle by a small rail pen. Near the spring were a large wash kettle and two tubs made by sawing a barrel in halves.

Our field of about thirty or forty acres of cleared land

extended down to and included a small creek bottom. In going to the field we passed through the orchard. This was an enclosure of about ten acres independent of the rest of the field.

Our house was situated about a mile from the "big road." This was a rocky, rough, and seldom traveled highway, and was the only road leading out of the vicinity. A creek ran through our property, between our house and the big road, which would often become swollen too deep and swift to ford, and as there was no other way of getting from our house to the big road, we just had to wait until the water subsided.

II

A CHUNK O'FAR

ABOUT the first work I ever did was to pick up chips. My father, in cutting up logs into fire stick length, left a lot of chips, and my job was to pick up the chips and take them into the kitchen as my mother needed them. When a little larger, I was able to assist Jim in bringing in small wood.

Since our house was far from airtight during the severe cold of the winter we had to keep heavy fires going. In making a fire we raked the ashes from the back, and my father laid in a back stick, as heavy as he could carry. He then placed another smaller stick in front, each end resting on a rock about the size of a brick. We knew nothing about andirons then. In between the two sticks of wood, we piled smaller wood, and built on up.

We had no friction matches, and it was very important that we keep fires from going out. To do this we covered

the fire with ashes before we went to bed, so that we would have live coals to start with the next morning. However, it was often the case that the fires went completely out anyway, and we then had to go to a neighbor's house and "borry" some fire. Many were the times when I had to get up in the cold and go to John Stewart's house a half mile distant, and "borry a chunk o' far," before we could build a fire in our house.

When we had to go off to borrow fire, we wanted it for immediate needs, and we therefore went in a hurry, got it in a hurry, and came back in a hurry. Even now, when a mountain man visits a neighbor and hints at going, the neighbor will say, "What's yer hurry? Did ye come arter a chunk o' far?"

We could solve our fire problem by creating the spark ourselves. On several occasions I have taken flint and held it just over some dry cotton lint and given the flint a downward stroke with my closed pocketknife. On doing this a spark would fly from the flint and strike the lint. I would blow this until it ignited and the fire was started.

I was ten years old before I ever heard of a cooking stove. We did all of our cooking in the kitchen fireplace. This necessitated fire in the kitchen every day in the year. The chips which I so often had to unwillingly quit my play for and bring in were used in cooking. The chips quickly burnt into coals, which were necessary in baking. My mother would rake out some coals, and put over them a three-legged skillet in which she placed biscuits. She then put a lid over the skillet and heaped coals on the lid. In this way she baked wonderful biscuits; I have never eaten any since as good.

All of our coffee came to us green, and my mother roasted it over the kitchen fire and ground it as she needed it. She made coffee by boiling the grounds and water together in the teakettle. When we were out of coffee, a good substitute could be made from parched corn meal and molasses.

Since we produced nearly everything that the family consumed, there was always plenty to do about the place. My father, Jim and I were kept busy tending the fields, caring for the stock, getting in the firewood, tanning hides, hunting, trapping and fishing. My mother and sisters had a great deal of work to do. Besides cooking, milking and churning, and attending to the house, they had to make all the clothing, from raw material to the finished product. As far back as I can remember, my mother and Lelia would sit up late at night and knit. They had to make all the hosiery, gloves, shawls and nubias, and as the winter approached they naturally had a great deal of knitting to do.

Every girl had to learn to cut out and make men's and women's clothing. Not only that, but she had to learn to manufacture the cloth from which the clothing was made. They carded the wool or cotton into rools or bats, and with a spinning wheel spun it into thread, and with a loom wove it into cloth. My mother wove a heavy woolen cloth that she used in making dresses for herself and the girls. She also wove an all-cotton cloth that could be used for making shirts and women's underwear.

We children went barefooted about eight months in the year. Should the weather get too severe before we had the money to buy the one pair of shoes each that we had

a year, my father was able to make a kind of moccasin out of tanned cowhide that served as a temporary relief.

We used to get choice wheat straw and plait it into hats which served for the summer. We had warm coonskin caps in the winter. I was fortunate if I could get a fifty-cent wool hat once a year.

Corn was the predominant crop and we had to raise it plentifully, as we used it for bread and fed it to our stock and poultry the year round. In that country corn is not perishable and will keep for two or three years. Besides corn we grew wheat, oats, tobacco, sorghum, potatoes and a little cotton. We had no market for any of these products, and they were all for our own consumption.

We had good orchards and very often the yield of large red apples was excessive, but it was unprofitable to market them, as we had to haul them too far. Sometimes, however, my father did take a load of red apples to the river bottoms and peddle them out.

We raised our cattle and sheep with little trouble, as there was cane in the creek bottoms, which they could feed on in the winter, and the herbage on the hillsides afforded splendid grazing in the summer. I remember how I used to go after the cows. In the late afternoon when Lelia and my mother wanted to milk, and the cows were not back, they would send me after them. We had one cow belled so we could locate the herd. I would go out into the woods and listen for the bell, and when I heard it, I quickly located the cows and drove them home.

It was important that we raise plenty of sheep, as they supplied the wool out of which we made our winter clothing. We sheared them once a year and that was in the spring so that the wool would grow back in time to keep

them warm in the winter. I always dreaded to see sheep-shearing time come, for I had to hold the sheep while my father sheared them.

There were some things, however, that we could not produce, and it took cash to buy them. We had to have shoes, farm implements, dishes and cooking utensils, such staples as sugar, coffee, salt, soda and dyestuff, and household remedies such as castor oil, turpentine and camphor gum.

My father was able to raise the necessary money for the family in various ways. He trapped for fur such animals as the otter, the beaver, the mink, the skunk and the raccoon. Then we raised a great deal of poultry and eggs which he occasionally took to market. Sometimes he went to the river bottoms and worked during the fall of the year. Cotton picking on the river plantations offered employment for men and women and children during the harvest. The mountain people take this work only as a last resort, because they enjoy their freedom too much to work willingly for someone else.

We rose early. When the chickens began crowing for day, we got out of bed. It was considered disgraceful for a man to be found in bed at sunup. He was laughed at and called lazy. We knew nothing about an eight-hour day or six-hour day. We worked when there was work to do and quit when it was through.

I will always remember when I learned to plow. We had two yearlings named Jolly and Brandy that my father was breaking in to work. Jim had been assisting him some, but I was considered too small to be of any help. However, I made such a noise about it that my father let me hold the lines and drive Jolly and Brandy, while Jim

held the plow. We were plowing new ground, and my father said he was breaking in the boys, the oxen, and the land.

We had an implement called ropeworks, with which my father made ropes. These ropes were used for plow lines, halters, bridle reins, and for many other purposes. The rope was about the only kind of string we had, except rawhide or tanned leather. We did not have any cotton or hemp twine. Therefore we had to tan a great many skins to supply the need for cord. Tanned squirrel skin made a nice shoelace, and well-tanned buckskin was used for hame strings, mending harness and for tying bundles to our saddles. Nearly every boy and man at all times had a buckskin string in his pocket, as it was handy when a good strong cord was needed.

The long winter evenings were spent around the fireside. My mother and sisters were kept busy knitting. My father passed the time in such duties as mending shoes, cutting buckskin into strings or molding bullets for the next day's hunt. Jim usually assisted my father, and my duties were mostly to keep the fires mended and the room lighted. "Chunk up the far, Wayman! Throw in a pine knot, Wayman!" were oft-repeated commands that I obeyed until I got to nodding and became so sleepy that I had to go off to bed.

There was not much reading going on in our house. Lelia and Nora studied the "Letter Writer" and song-book, my father read the almanac to learn what the weather was, and Jim studied the dream book. My mother always read the Bible on Sunday afternoon, when we stayed at home. One day Jim traded his Barlow pocketknife to Joe Burton for a badly worn copy of

"Peck's Bad Boy." Joe could not read, and after he was through looking at the pictures he had no further use for it. My father and Lelia read and reread the book aloud, while the rest of us listened attentively. Not long after this my father brought home a yellow-back, paper-bound book that he had borrowed from Squire George. The title of the book was "The Adventures of Dr. Rattlehead." This book was a sidesplitter and well illustrated. We read it so much that we soon learned it by heart. One day my mother, in coming home from Aunt Lou's, brought home a book. I do not remember the title of it, but it was a history of Jim Copeland, a notorious freebooter who plied his nefarious practices in the early days of the state.

With this supply of literature the family managed to get along fairly well until the advent of the history of the James boys.

Sometimes a book agent came amongst us, but it was seldom that he did any business. Somehow, the people were not favorably impressed with book agents, as they were nearly all "furriners," and it was supposed that they were following that avocation for the sole purpose of trying to "beat work." However, I remember one instance where my father subscribed.

One day about noon a man rode up to our house and inquired for my father. He was down in the field, and my mother sent Jim after him.

"Paw," said Jim, "they's a man at the house wot wants ter see you."

"Who is it?" asked my father.

"Dunno," replied Jim. "He looks lak a furriner."

My father came on up to the house.

"Good morning, Mr. Hogue," said the stranger.

"O'Neal is my name. I am taking orders for the 'Royal Path of Life!' I have heard a great many say that you are a man well educated and well read and that all your family enjoy reading good books. With your permission I will just show you a few sample pages of this wonderful work."

The agent then produced his prospectus and began turning the pages in rapid succession, as he continued his sales talk. All of us except my mother stood by, looking at the book as the agent described it.

"Hit looks lak a good book," my father said after the agent was through with his talk. "What do yourens thank uv it?" he asked, addressing Lelia and Nora.

Lelia thought it was a handsome book and would make a mighty good showing when laid on the mantel when company came. It would give to our house the appearance of the "rich folks'" dwelling.

Nora liked it, but she thought of a better use for it. On account of its size she had an idea that it would be nice to cut out the leaves and paste them on the walls when we got through reading it, as it would make the room more attractive.

Jim and I liked the book, especially the pictures, but we did not think they were as funny as those in the almanac.

My father did not know much about what was in the book, but he noticed that it had gold letters on the back and sides, and he concluded that it must be a valuable book.

So the consensus of opinion was that while the book would not measure up to the standards of "Peck's Bad Boy" and "Dr. Rattlehead," it was a fairly good book,

and my father wrote his name under the others. Dinner was ready then, so he asked the agent to stay.

During all the proceedings my mother had said nothing, but stayed back in the kitchen and frowned unapprovingly. She didn't like furriners to begin with and was displeased at my father's buying the book, and she was downright angry with him for asking the agent to stay for dinner, because she had to dip into the little coffee and brown sugar that she was saving for Saturday night when the preacher and his wife, Brother and Sister Yates, were coming for supper.

"School is comin' on," my mother said to Lelia, "an' yore paw ain't got narry a cent to buy books and slates and pencils with, and yit youens want him to buy that ole book from that stuckup furriner. An' youens kep on after him till he had to take two papers when one would have done."

When a weekly newspaper was established in our county it supplied a longfelt want. In loading the shotgun we had to have a lot of wadding and this was hard to get. Last year's almanac was soon exhausted and we had a hard time finding paper for gun wadding. Therefore we began taking the county weekly as soon as it came out.

One day a sheet writer came to our house, and among the papers he was soliciting for, was the Weekly Arkansas Gazette. Lelia and Nora liked the looks of the Gazette and wanted my father to stop the county weekly and subscribe for the Gazette. My father didn't want to do it and that brought on a long argument as to which was the better paper. My father liked the county paper because it was softer and sleazier and made better gun wadding and there was just enough of it for his purposes. The girls liked the Gazette much better. It was larger, was of

a better grade of paper, and easier to cut out and notch, and so much better to use for making mantel scarfs. Also, because there was so much of it, they could soon save up enough to paper the house.

My father could not see his way clear to give up the county weekly so he compromised matters by taking both papers.



BEFRIENDING THE UNDERDOG

by John Fox, Jr.

TWICE, during the night, Jack roused him by trying to push himself farther under the blanket and Chad rose to rebuild the fire. The third time he was awakened by the dawn and his eyes opened on a flaming sun in the east. Again from habit he started to spring hurriedly to his feet and, again sharply conscious, he lay down again. There was no wood to cut, no fire to rekindle, no water to carry down from the spring, no cow to milk, no corn to hoe; there was nothing to do — nothing. Morning after morning, with a day's hard toil at a man's task before him, what would he not have given, when old Jim called him, to have stretched his aching little legs down the folds of the thick feather bed and slipped back into the delicious rest of sleep and dreams? Now he was his own master and, with a happy sense of freedom, he brushed the dew from his face and, shifting the chunk under his head, pulled his old cap down a little more on one side and closed his eyes. But sleep would not come and Chad had his first wonder about what to do.

So Chad, with Jack drawn close to him, lay back, awestricken and with his face wet from mysterious tears. The comfort of the childish self-pity that came with every thought of himself, wandering, a lost spirit along the mountaintops, was gone like a dream and ready in his heart was the strong new purpose to strike into the world for himself. He even took it as a good omen, when he rose, to find his fire quenched, the stopper of his powder horn out, and the precious black grains scattered hopelessly on the wet earth. There were barely more than three charges left, and something had to be done at once. First, he must get farther away from old Nathan: the neighbors might search for him and find him and take him back.

So he started out, brisk and shivering, along the ridge path with Jack bouncing before him. An hour later, he came upon a hollow tree, filled with old wood which he could tear out with his hands and he built a fire and broiled a little bacon. Jack got only a bit this time and barked reproachfully for more; but Chad shook his head and the dog started out, with both eyes open, to look for his own food. The sun was high enough now to make the drenched world flash like an emerald and its warmth felt good, as Chad tramped the topmost edge of Pine Mountain, where the brush was not thick and where, indeed, he often found a path running a short way and turning into some ravine — the trail of cattle and sheep and other. He must have made ten miles and more by noon — for he was a sturdy walker and as tireless almost as Jack — and ten miles is a long way in the mountains, even now. So, already, Chad was far enough away to have no

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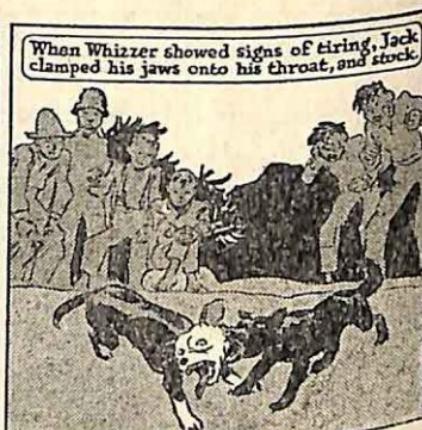
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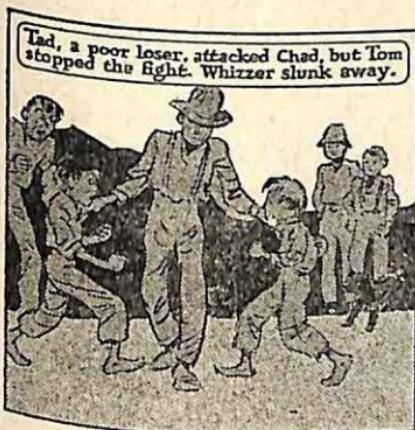
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fear of pursuit, even if old Nathan wanted him back, which was doubtful. On the top of the next point, Jack treed a squirrel and Chad took a rest and brought him down, shot through the head and, then and there, skinned and cooked him and divided with Jack squarely.

"Jack," he said, as he reloaded his gun, "we can't keep this up much longer. I hain't got more'n two more loads of powder here."

And, thereupon, Jack leaped suddenly in the air and, turning quite around, lighted with his nose pointed, as it was before he sprang. Chad cocked his old gun and stepped forward. A low hissing whir rose a few feet to one side of the path and, very carefully, the boy climbed a fallen trunk and edged his way, very carefully, toward the sound: and there, by a dead limb and with his ugly head reared three inches above his coil of springs, was a rattle-snake. The sudden hate in the boy's face was curious—it was instinctive, primitive, deadly. He must shoot off-hand now and he looked down the long barrel, shaded with tin, until the sight caught on one of the beady, unblinking eyes and pulled the trigger. Jack leaped with



Tom and Rube and Dolph took the homeless but plucky Chad and Jack home with them.



the sound, in spite of Chad's yell of warning, which was useless, for the ball had gone true and the poison was set loose in the black, crushed head.

"Jack," said Chad, "we just got to go down now."

The sun had dropped midway between the zenith and the blue bulks rolling westward and, at the next gap, a broader path ran through it and down the mountain. This, Chad knew, led to a settlement and, with a last look of choking farewell to his own world, he turned down. At once, the sense of possible human companionship was strong: at once, the boy's half-wild manner changed and, though alert and still watchful, he whistled cheerily to Jack, threw his gun over his shoulder, and walked erect and confident. Soon he was below the sunlight and in the cool shadows where the water ran noisily and the air hummed with the wings of bees. On the last spur, he came upon a cow browsing on sassafras bushes right in the path and the last shadow of his loneliness straightway left him. She was old, mild, and unfearing, and she started down the road in front of him as though she thought he had come to drive her home, or as though

she knew he was homeless and was leading him to shelter. A little farther on the river flashed up a welcome to him through the trees and at the edge of the water her mellow bell led him downstream and he followed. In the next hollow, he stooped to drink from a stream that ran across the road and, when he rose to start again, his bare feet stopped as though riven suddenly to the ground; for, half-way up the next slope, was another figure as motionless as his—with a bare head, bare feet, a startled face and wide eyes—but motionless only until the eyes met his: then there was a flash of bright hair and scarlet homespun, and the little feet, that had trod down the centuries to meet his, left the earth as though they had wings and Chad saw them, in swift flight, pass silently over the hill. The next moment, Jack came too near the old brindle and, with a sweep of her horns at him and a toss of tail and heels in the air, she, too, swept over the slope and on, until the sound of her bell passed out of hearing. Even today, in lonely parts of Cumberland, the sudden coming of a stranger may put women and children to flight—something like this had happened before to Chad—but the sudden desertion and the sudden silence drew him in a flash back to the lonely cabin he had left and the lonely graves under the big poplar and, with a quivering lip, he sat down. Jack, too, dropped to his haunches and sat hopeless, but not for long. The chill of night was coming on and Jack was getting hungry. So he rose presently and trotted ahead and squatted again, looking back and waiting. But still Chad sat and, in a moment, Jack heard something that disturbed him, for he threw his ears toward the top of the hill and, with a growl, trotted back to Chad and sat close to him looking up the slope. Chad

rose then with his thumb on the lock of his gun and over the hill came a tall figure and a short one, about Chad's size; and a dog, with white feet and white face, that was bigger than Jack: and behind them, three more figures, one of which was the tallest of the group. All stopped when they saw Chad, who dropped the butt of his gun at once to the ground. At once the strange dog, with a low snarl, started down toward the two little strangers with his yellow ears pointed, the hair bristling along his back, and his teeth in sight. Jack answered the challenge with an eager whimper, but dropped his tail, at Chad's sharp command—for Chad did not care to meet the world as an enemy, when he was looking for a friend. The group stood dumb with astonishment for a moment and the small boy's mouth was wide-open with surprise, but the strange dog came on with his tail rigid, and lifting his feet high.

"Begone!" said Chad, sharply, but the dog would not begone; he still came on as though bent on a fight.

"Call yo' dog off," Chad called aloud. "My dog'll kill him. You better call him off," he called again, in some concern, but the tall boy in front laughed scornfully.

"Let's see him," he said, and the small one laughed, too.

Chad's eyes flashed—no boy can stand an insult to his dog—and the curves of his open lips snapped together in a straight red line. "All right," he said, placidly, and, being tired, he dropped back on a stone by the wayside to await results. The very tone of his voice struck all shackles of restraint from Jack, who, with a springy trot, went forward slowly, as though he were making up a definite plan of action; for Jack had a fighting way of his own, which Chad knew.

"Get him, Whizzer!" shouted the tall boy, and the group of five hurried eagerly down the hill and halted in a half circle about Jack and Chad: so that it looked an uneven conflict, indeed, for the two waifs from Pine Mountain.

The strange dog was game and wasted no time. With a bound he caught Jack by the throat, tossed him several feet away, and sprang for him again. Jack seemed helpless against such strength and fury, but Chad's face was as placid as though it had been Jack who was playing the winning game. Jack himself seemed little disturbed; he took his punishment without an outcry of rage or pain. You would have thought he had quietly come to the conclusion that all he could hope to do was to stand the strain until his opponent had worn himself out. But that was not Jack's game, and Chad knew it. The tall boy was chuckling, and his brother of Chad's age was bent almost double with delight.

"Kill my dawg, will he?" he cried shrilly.
"Oh, Lawdy!" groaned the tall one.

Jack was much bitten and chewed by this time, and, while his pluck and purpose seemed unchanged, Chad had risen to his feet and was beginning to look anxious. The three silent spectators behind pressed forward and, for the first time, one of these — the tallest of the group — spoke:

"Take yo' dawg off, Daws Dillon," he said, with quiet authority; but Daws shook his head, and the little brother looked indignant.

"He said he'd kill him," said Daws, tauntingly.
"Yo' dawg's bigger and hit ain't fair," said the other

again and, seeing Chad's worried look, he pressed suddenly forward; but Chad had begun to smile, and was sitting down on his stone again. Jack had leaped this time, with his first growl during the fight, and Whizzer gave a sharp cry of surprise and pain. Jack had caught him by the throat, close behind the jaws, and the big dog shook and growled and shook again. Sometimes Jack was lifted quite from the ground, but he seemed clamped to his enemy to stay. Indeed he shut his eyes, finally, and seemed to go quite to sleep. The big dog threshed madly and swung and twisted, howling with increased pain and terror and increasing weakness, while Jack's face was as peaceful as though he were a puppy once more and hanging to his mother's neck instead of her breast, asleep. By and by, Whizzer ceased to shake and began to pant; and thereupon, Jack took his turn at shaking, gently at first, but with maddening regularity and without at all loosening his hold. The big dog was too weak to resist soon and, when Jack began to jerk savagely, Whizzer began to gasp.

"You take yo' dawg off," called Daws, sharply.
Chad never moved.

"Will you say 'nough fer him?" he asked, quietly; and the tall one of the silent three laughed.

"Call him off, I tell ye," repeated Daws, savagely; but again Chad never moved, and Daws started for a club. Chad's new friend came forward.

"Hol' on, now, hol' on," he said easily. "None o' that, I reckon."

Daws stopped with an oath. "Whut you got to do with this, Tom Turner?"

" You started this fight," said Tom.

" I don't keer ef I did — take him off," Daws answered, savagely.

" Will you say 'nough fer him? " said Chad again, and again Tall Tom chuckled. The little brother clinched his fists and turned white with fear for Whizzer and fury for Chad, while Daws looked at the tall Turner, shook his head from side to side, like a balking steer, and dropped his eyes.

" Y-e-s," he said, sullenly.

" Say it, then," said Chad, and this time Tall Tom roared aloud, and even his two silent brothers laughed. Again Daws, with a furious oath, started for the dogs with his club, but Chad's ally stepped between.

" You say 'nough, Daws Dillon," he said, and Daws looked into the quiet half-smiling face and at the stalwart two grinning behind.

" Takin' up again yo' neighbors fer a wood-colt, air ye? "

" I'm a-takin' up fer what's right and fair. How do you know he's a wood-colt — an' suppose he is? You say 'nough now, or — "

Again Daws looked at the dogs. Jack had taken a fresh grip and was shaking savagely and steadily. Whizzer's tongue was out — once his throat rattled.

" 'Nough! " growled Daws, angrily, and the word was hardly jerked from his lips before Chad was on his feet and prying Jack's jaws apart. " He ain't much hurt," he said, looking at the bloody hold which Jack had clamped on his enemy's throat, " but he'd a-killed him though, he al'ays does. That ain't no chance fer no dog, when Jack gits that holt."

Then he raised his eyes and looked into the quivering face of the owner of the dog—the little fellow—who, with the bellow of a yearling bull, sprang at him. Again Chad's lips took a straight red line and being on one knee was an advantage, for, as he sprang up, he got both underholds and there was a mighty tussle, the spectators yelling with frantic delight.

"Trip him, Tad," shouted Daws, fiercely.

"Stick to him, little un," shouted Tom, and his brothers, stoical Dolph and Rube, danced about madly. Even with underholds, Chad, being much the shorter of the two, had no advantage that he did not need, and, with a sharp thud, the two fierce little bodies struck the road side by side, spouting up a cloud of dust.

"Dawg—fall!" cried Rube, and Dolph rushed forward to pull the combatants apart.

"He don't fight fair," said Chad, panting, and rubbing his right eye which his enemy had tried to "gouge"; "but lemme at him—I can fight that away, too." Tall Tom held them apart.

"You're too little, and he don't fight fair. I reckon you better go on home—you two—an' yo' mean dawg," he said to Daws; and the two Dillons—the one sullen and the other crying with rage—moved away with Whizzer slinking close to the ground after them. But at the top of the hill both turned with bantering yells, derisive wriggling of their fingers at their noses, and with other rude gestures. And, thereupon, Dolph and Rube wanted to go after them, but the tall brother stopped them with a word.

"That's about all they're fit fer," he said, contemptuously, and he turned to Chad.

"Whar you from, little man, an' whar you goin', an' what mought yo' name be?"

Chad told his name, and where he was from, and stopped.

"Whar you goin'?" said Tom again, without a word or look of comment.

Chad knew the disgrace and the suspicion that his answer was likely to generate, but he looked his questioner in the face fearlessly.

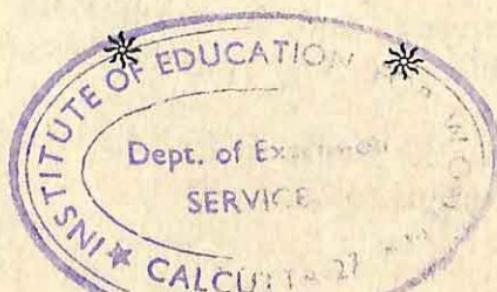
"I don't know whar I'm goin'."

The big fellow looked at him keenly, but kindly.

"You ain't lyin' an' I reckon you better come with us." He turned for the first time to his brothers and the two nodded.

"You an' yo' dawg, though Mammy don't like dawgs much; but you air a stranger an' you ain't afeerd, an' you can fight — you an yo' dawg — an' I know Dad'll take ye both in."

So Chad and Jack followed the long strides of the three Turners over the hill and to the bend of the river, where were three long cane fishing poles with their butts stuck in the mud — the brothers had been fishing, when the flying figure of the little girl told them of the coming of a stranger into those lonely wilds. Taking these up, they strode on — Chad after them and Jack trotting, in cheerful confidence, behind.



TOWING A CANAL BOAT WESTWARD

by Lucy Sprague Mitchell

THE whole family had discussed for weeks which was the best horse to take. Indeed, it was a matter which concerned the whole family. For the Moores with their three children and Peter, a fifteen-year-old Dutch orphan boy who lived with them, were moving westward with one horse and a flatboat. Which horse? That was the agitating question.

The three children voted for Babe, the gentle old mare. But Father said she was too old to pull the boat after they reached the canal. Mother Moore voted for Wild Fire, Babe's ten-year-old son, because she could not bear to leave behind a beautiful horse which she had raised from a colt. But he had never been on a towpath and who could tell whether he would submit to a steady two-and-a-half-mile-an-hour pace? Wild Fire had not got his name for nothing! Father Moore and Peter said there was nothing to discuss. Jan Kip was "the" horse. Had he not been in the Erie Canal service for two years? Was he not the strongest horse for miles around? And had not his mother been the famous Nita, who had raced Peter Cooper's Tom Thumb? Yes. The rest agreed. Jan Kip was "the" horse, although the other members of the family sighed at the thoughts of leaving their favorites behind.

Almost everything had happened to Jan Kip in the course of his long life. Dray horse, canal horse, farm horse; he had even trod an endless belt in a queer car which made it go. But never before had he been asked to live in an ark and float down a river with a family.

Yet that is what happened to him in the spring of 1838. And he was inclined to protest, at least at first. The big bay whinnied and stamped in his new stall on the ark. The family, arranging things in their new quarters alongside of him, all heard. Mrs. Moore looked worried and said mildly, "We might as well have taken Wild Fire. He would have been no worse than this." And little William added, "Babe is the best horse. She never kicks." But Peter said nothing, at least not to the family. Edging past the big horse in the stall, he gently stroked his flanks, his withers, his thick neck, his nose, saying over and over in a singsong voice, "You'll like it, Jan Kip, soon as you're used to it. You'll like it, Jan Kip."

It was not only Jan Kip who was upset. Everyone was a bit excited, particularly the children. For were they not leaving almost all that they had known in their short lives which meant "home" to them? And were they not going to a strange and wonderful unknown place called Illinois? And going in a boat, too! Father had made their boat with the help of Benjamin Cutter — Peter had helped, too, as he did at almost everything. It was of the ark type, a flat raft drawing only two feet of water, with a fair-sized, flat-roofed box of a room on top and a little deck in front and another on top of the room. Inside, this room was a kitchen, sitting room and bedroom for all the family except Peter and Jan Kip. Behind this general room was a tiny stable — just like a large box stall. Here it was that Jan Kip was stamping. But when he found hay and oats before him and felt the familiar hand of Peter, he decided that he'd better make the best of it like the sensible old horse he really was. So by the time the last things had been brought on board and Mother had a fire

going in the little stove and Gretchen and William had cried over Babe — though they were sure the people who had bought her would be good to her — by the time Peter had said for the twentieth time, " You'll like it, Jan Kip, soon as you're used to it," Jan Kip was ready to believe it himself. To show that he accepted his lot, he stopped stamping, stuck his head out of the little window at the back of his stall and gave a friendly neigh to the world at large.

Thus they started one June day on the upper waters of the Lackawanna on their long water journey to the West. Why were they going? Chiefly because John Moore came of pioneer stock and the longing to press on to the frontier lands was strong in him. Then, too, he didn't like the way the country around him was developing. The land for miles around seemed to be full of "stone coal" which, a few years ago, the iron foundries had found a way to burn. On every side coal mines were opening. His farm, too, was said to have rich veins. John Moore, however, had no wish to be anything but a farmer. He had an offer to sell out to the mining company at a big profit. "It's our chance to get West," he said to his wife. "Let's go to Illinois." And Phoebe Moore had been glad, too — since the farm was to be sold and they had to move anyway. She was glad to go West. And Peter was wild with joy. He had had an unhappy childhood. His father, Peter Groot, had come over from Holland as an "indentured servant." That is, he agreed to work for ten years for his food and clothes. At the end of that time he was to be free and to be given ten bushels of wheat, two suits of clothes, and five dollars. In Pennsylvania, besides this, from fifty to seventy-five acres of land would be given

to him. But he had died just before his term of service was over. Little Peter was then four. His mother had died three years before. So little "Dutch Pete," as he was called, had knocked about as a public charge until Phoebe Moore took him into her family to work for them. The last seven years had been busy and happy. Still it was no wonder Peter was glad to leave the place. They all were glad for different reasons. Thus the western pilgrimage came about.

The first part of the journey they drifted downstream with the current. Sometimes they even hoisted a sail to help the clumsy craft on its way. The children played hopscotch on the deck or the flat roof or watched the lovely country slip by them. The wooded hills had here and there been cleared for farms. Often their greetings were answered by a cheery Dutch "Goeden morgen" and Peter, beaming, called back "Goeden dag!" The hills were often scarred where mines both of iron and coal had been opened. Later they often saw a strange smoky smudge ahead of them. When they came near their astonished eyes saw huge chimneys, monster hive-shaped buildings with flowing fires. These were the new blast furnaces and rolling and slitting mills and factories where nails and brads were made by machinery. Not much did they see of Indians. Iron and coal together were fast turning the wilderness, the old Indian villages, and even the farms into manufacturing settlements. But this was later on in the journey.

On the upper reaches of the Lackawanna there floated a procession of barges heaped with coal. Often the ark joined a group of these flatbottomed scows and together they drifted slowly and peacefully downstream. The

Moores tied up for the nights in some sheltered nook out of the current. They tried to stop where the country was open. Then Jan Kip had his fun. And whatever Jan Kip enjoyed, Peter enjoyed, too; for the boy loved the big horse as he loved nothing else on earth. The ark was made fast to the side of the stream and the gangplank placed in position. Off the great bay lumbered, head high and ears cocked for the new adventure. First he would roll. And a sight it was indeed when Jan Kip rolled! Oh, Nita of the fleet feet, what would your mother's heart have thought to see your two-thousand-pound son, his four feathered feet waving in the air, lurching his vast body this way and that trying to scratch the middle of his huge back! Little Melissa watched spellbound. And when she played Jan Kip on the deck, as she did most of the day, at this point she wildly waved her fat two-year-old legs.

After Jan's roll came the run. No one but Peter could stick. Indeed, Jan Kip did not want anyone else on his back and took prompt measures to remove anyone else. But the big Belgian horse and Dutch Pete had a special understanding and had had ever since the boy, a miserable, thin, little eight-year-old had joined the Moore family and slept in the hay next to Jan Kip's stall. Nowadays, Peter was anything but miserable and thin. His cheeks were red and his legs were long and his shoulders were broadening to a man's width. Yet on top of the great Belgian he looked small enough. He would lean far forward to get a firm grip in the thick black mane, which rose like a crest on the top of the thick neck. Then away they would go with a heavy ponderous pound. The boy thought it was the gentlest gait in the world!

And after the run came the feeding. For they couldn't carry much hay on the ark and the spring grass was fresh and juicy and good grazing. Besides, the hay was Peter's bed; for the boy much preferred a soft bed of sweet hay to the hard boards, arranged one above the other like shelves on which the Moore family laid themselves at night.

Ofttimes while Jan Kip grazed, Peter lay in the grass looking up at the darkening sky—for they did not tie up till night was coming on—thinking of what he was going to do in Illinois. He'd be sixteen by the time they got there. Five years and he'd be twenty-one. That seemed to Peter old enough for anything! He saw himself running his own farm. Son of a man who had been bound to service half like a slave, he desired to have something he could call his own. His farm—grain and some fruit, he thought it would be. Of course, a vegetable garden for the family. What family? Peter paused for a moment. But only for a moment. Two minutes were enough for Peter to build up a satisfactory family. A wife, he supposed, "'cause it was hard work with no women-folks" and "a few kids just to seem natural and to help him when they grew up." And, of course, he'd have meadowland to cut hay from for Jan Kip—for Peter always imagined the big horse in his dreams of the future. Oh, boy Peter, lying on your back dreaming in the half-light to the sound of Jan Kip's crunching of the juicy grass, you were not so far wrong. For farm and family and Jan Kip himself all came to you in Illinois, even as you dreamed.

Sometimes when the night was mild they hobbled the great bay and let him feed all night. Peter, lying on the

soft hay on the tethered boat, could hear his jerky jumping through the night. And in the early morning he would steal ashore before any of the Moores were stirring to unhobble the horse for a morning gallop before breakfast. A wild happy pair they were then.

On the way the family picked up vegetables and fruit from farms they passed. Much they had brought, too. And Mrs. Moore found life on the little boat easy compared with that on the farm. Cooking, washing, mending for her little family seemed little more than play in the tiny kitchen where everything was so tidy and convenient. Yet there were exciting moments. For William one day tried to climb the little iron chimney which ran up alongside of the roof deck. Blistered hands, butter-and-flour dressing and a helpless little bandaged boy was the result. His hands were just out of bandages when Melissa fell overboard. The boat was moored by the bank and Gretchen and William had gone to ask for some milk at a near-by farmhouse while Peter was getting ready to take Jan Kip for a run. Phoebe Moore had thrown some scraps overboard and a whole school of greedy little fishes had gathered by the boat, opening their mouths and grabbing at the tender morsels, their fins and tails aquiver in the water. Melissa was entranced. "Pretty fishes, wiggly fishes, Melissa's fishes," she chanted. Farther and farther she leaned over the deck rail. "Melissa's fishes, pretty fishes, squirmy fishes!" Then she went in — right into the midst of the scared, wiggly fishes. Peter from Kip's stall heard the splash. In a moment he had kicked off his shoes and jumped in after the little girl. It wasn't deep for him. Besides he swam like a squirmy fish himself. It took but a moment to grab Melissa and hold her

up where Mrs. Moore could pull her in. Then he climbed up himself and stood dripping on the deck. "Is she hurt, Mrs. Moore?" he asked. Mrs. Moore stopped hugging the wet Melissa and flung her arms around the dripping Peter. Melissa herself, leaving a watery track behind her, trotted to the railing and peered over. "Where pretty fishes, wiggly fishes, Melissa's fishes?" she murmured, looking down into the water. "Like pretty fishes, wiggly fishes, squirmey fishes. Come back, wiggly fishes, squirmey fishes, Melissa's fishes."

Peter laughed. "I guess she isn't much hurt." Mother laughed too. She couldn't help it, though the tears still ran down her cheeks. "No, thanks to you, Peter," she said. And Mrs. Moore never forgot that day. Indeed, it was partly because of his saving Melissa that Jan Kip eventually became Peter's.

It was only ten days of drifting before the Lackawanna reached the valley of the Susquehanna. From here the main stream of the Susquehanna took its course southeast to the ocean. And along its laughing waters ran the nearly completed Susquehanna Tide Water Canal while another canal went west, following the Juniata River. To the west they turned the nose of the little ark. And then an entirely new kind of life began — particularly for Jan Kip and Peter. For the drifting ark turned into a canal-boat and Jan Kip, hitched to a long rope, trod the towpath for many hours a day. Without a protest the great horse settled back into the habits of earlier days when he had pulled a packet boat on the Erie Canal. His great muscles knotted and his great back flattened as he threw his weight forward on the tugs to start the boat. Yet when once started the little ark slipped along easily in the smooth

waters of the canal. Plodding, plodding, pulling, pulling. Hour after hour moved Jan Kip and after him glided the ark. Peter either walked behind or, when he was weary, mounted to the broad back. For Jan Kip seemed not to mind the boy's added weight, so powerful was he. Now when they wanted to stop to feed Jan Kip or to rest for the night they had to get away from the shore where boats and scows passed continually. This they did with the aid of long pikes by which, on the shallow bottom, they poled themselves to the center of the forty-foot wide canal. Beyond, over the narrow strip of land ever raced the Juniata, full of swirls and whirls, little rapids and back eddies—a lively contrast to the placid, even canal with its slow procession of crafts moving along either shore.

And what an exciting procession of crafts it was to watch, at least for the Moore children, who had been born and brought up on a remote Pennsylvania farm with few neighbors and no travelers. Great numbers of rafts bearing coal and farm products passed oceanward, sometimes almost a hundred a day. Also a good many family arks like their own. No, not like theirs, thought Peter, because there was no Jan Kip aboard. But the great excitement of the day was meeting the packet boat. The first they met was the "Pittsburgh" and a beauty she was, red and black stripes below, white above, with thirty green-shuttered windows. On the top sat the passengers, elegant gentlemen in tight, light-colored trousers, long-tailed coats with high stocks; elegant ladies with spreading, bouncing skirts and round poke bonnets. Clean little long-trousered boys and clean little girls with pantaloons showing below their dresses. How they did stare at the

Moore's ark, particularly when Jan Kip's head was looking out of his window.

Sometimes from the packet boat came the odor of cooking and the sound of dishes rattling. The passengers had all gone from the roof. They were inside, eating. Sometimes towards evening they saw preparations for the night going on in the boat. Through the windows they could see the one-time dining room turned into a queer bedroom. Shelves had dropped down from the walls, with curtains in front of them, mattresses covered the tables. The children thought it must be fun to sleep in a room with so many people. But Peter preferred his hay bed even to this. Sometimes the packet boat came to a bridge. The rope was unhitched. The boat glided under the bridge. Once they saw a man who wanted to get on. He ran to the bridge and waited till the boat was just coming out and down he jumped on the deck. The passengers laughed, the ladies in their big skirts, and the men in their tight trousers, but most of all the children laughed. The rope was fastened again and once more the horses were plodding on.

Then came Jan Kip's great day. The Moore children had been told that they might see a half-brother of Kip's. Indeed the "Big White" had the reputation of being the finest horse in Pennsylvania canal service. Wherever they stopped the children asked about the Big White.

They always got the same answer, "The Big White? Of course. Everyone knows him. He's stronger than an ox. You know his father was the famous Percheron Dan brought over from France and his mother was Nita, who raced Tom Thumb." Then the children would laugh excitedly. "Jan Kip's mother was Nita, too," they'd

say in a breath. And then it was the stranger's turn to be interested. He'd look Kip over carefully. "A fine horse," would be his verdict. "Not as big as the Big White. But you can see he's the same blood."

At last they met, the two huge sons of the fleet-footed Nita. It was at one of the locks near Huntingdon on the Juniata River. John Moore knew that the Big White was expected with the next downstream packet boat. It so happened that the upstream packet was there, too. Peter had ridden Jan Kip around by the steep road which led to the upper part of the locks and on the way he had told the canal men and boys about the expected meeting of the two horses. The Moore family had assembled on their roof deck. Besides the ark there were a number of loaded rafts and the upstream packet boat to be lifted to the upper level. The children loved the locks best of all the happenings on the canal. The gates were opened, the water ran into the enclosure where the boats floated and up, up they went with the rising water. Sometimes there were three or four of these locks together so that when they reached Jan Kip on the upper level they looked down forty or fifty feet to the lower canal on which they had come. For the valley of the Juniata was winding its way up into the mountains and the flat canal water had to rise by these steps. When they reached the upper level on this particular day there stood the familiar figure of the big horse and Peter perched on his back. Quite a crowd was standing near, both of men who drove the canal horses or handled the locks and of passengers from the packet boat.

Then they see the other one coming. There are three horses plodding single file and after them glides the pretty little canalboat. No doubt which one is the Big White.

Nearest to the boat he is, for he is by far the strongest of the three. A huge, white horse with thick neck and deep, powerful chest and firm-muscled legs lifted high with fine action. As the crowd watches him approach there is a murmur of admiration, for he is well known to the people who travel the canal, even to those who have never ridden on the elegant little packet. They look from him to Jan Kip. "The same breed," they say. "You'd know they had the same mother—the famous Texan Nita, who raced with Tom Thumb." One downstream passenger asks, "Who is this Nita? And who is Tom Thumb?" The crowd gathers, though they know it well. Peter, perched on top of Jan Kip, nearly bursts with pride.

"What? You never heard of that race? And you don't know who Tom Thumb is? Well, where do you come from, anyway? From Ohio? Oh, I thought it must be very far away or you'd have heard of Nita and Tom Thumb!"

Then the passenger tells the story, the same story that Nita had whinnied to Jan Kip and the Big White when they were colts. (How much of it did either horse remember as he walked the towpath in the June sun?) Tom Thumb was a new kind of machine called a locomotive. It had a boiler and a long smokestack and it pulled cars on a track "without horses"! Did you ever see the like of that? I guess not. Nobody else did either until Peter Cooper made this contraption six years ago. Well, when Tom Thumb was all ready for his first run down at Baltimore, what did they do but arrange for a race between this preposterous little engine hitched up to a car and a horse hitched up to a car — both of them to run

on tracks. That was a race! Nita whinnies as she remembers it and her eyes roll like a wild horse's. All her mustang blood is stirred. She looked almost like her great, great, great grandfather, the white-nosed leader of the Texan wild horses who broke into a trapper's corral and ran away with the white mare Bianca! Did Baby Kip or the big white colt understand what she was whinnying about? Did they ask her how the race came out? I don't know. But that is what the stranger traveler on the packet boat asks, "Who won the race?" And the other passenger tells him. "At first Tom Thumb got ahead. The silly little machine puffed and snorted and actually went off down the track at thirteen miles an hour. But then Nita got her wind. And away she went down the track, the car flying along behind her. There's nothing like mustang blood you know! And at the end Nita came in ahead! Stationary engines may be all right in their way. But locomotives! I doubt if they can ever equal a really good horse!" And the two passengers walk forward for a better look at the Big White whose mother came from the breed of wild horses of Texas and whose father was Dan, the famous French Percheron. Kip, do you remember any of these stories that Nita whinnied to you when you were a small colt? Big White, if you were turned loose on the rolling plains of Texas would you gallop away like your great, great, great, great grandmother Bianca? Who knows? Plodding, plodding, pulling, pulling; he keeps his even pace — three and a half miles an hour along the towpath.

And the great white horse looming larger and larger along the towpath, does he remember the year-old bay brother who raced around the meadow when he was a

long-legged baby colt and nursed from the fleet-footed Nita?

Now they have met. The packet boat is slipped into the lock to be lowered and the patient plodding horses have crossed the bridge to the upstream side of the canal. Jan Kip and the Big White stand side by side, Peter still perched proudly on Kip's back. They smell of each other in a friendly, indifferent way. They whinny softly. What does their whinny mean? Does the smell stir any memories? No. The Big White knows it is feeding time. He is thinking of the hay in the stall — for he has a time off now. And Jan Kip, though he's had his noonday meal, still longs for a bit of the tender green grass edging the towpath. The horses are led off. The crowd divides. Three fresh horses are brought out for the upstream packet and away she glides on the towpath at the pace of three and a half miles an hour. Jan Kip, too, takes his place on the towpath. John Moore poles the ark alongside the bank. The rope is fastened. Peter, behind the great horse, says, "All right, Kip. Get up." And off they go up the canal. Plodding, plodding, pulling, pulling. So met the two sons of Nita — met once and parted.

Then, at last, the family reached the part of the journey that had worried John Moore from the beginning. They were well up into the mountains at Hollidaysburg on the Juniata River. The mountains had been closing in on them till when they reached Hollidaysburg on the Juniata it seemed impossible for boats to go farther. As John Moore looked up at the rolling wooded hills he felt that Philadelphia could never hope to get much trade from the West if the cargoes had to climb those heights. He knew that the Erie Canal to the north with scarcely any climb

slipped through a pass in the mountains alongside of the Mohawk River. "Of course, New York will get the trade, even though it's a longer route," he said to his wife. And then he saw what Pennsylvania had done to get the boats over the mountains, to try to make the procession of boats that streamed down the Great Lakes turn towards Philadelphia by way of the Pennsylvania Canal. It was amazing, unbelievable! The Moore family saw with uneasy distrust a long incline climbing up, up into the mountains. Surely a queer road for a boat to travel! The officials came and looked over the ark carefully. "Yes, yes. That will go over all right. But not the horse. My, what a horse — looks almost like the Big White himself." So the officials had to be told the tale, much to the children's joy.

"But what about Jan Kip?" inquired the anxious Peter.

"You'll have to ride him around by the trail."

That satisfied Peter. He much preferred it anyway to trusting himself to a car at the end of a cable to be pulled up into the mountains by a stationary engine. A horse was more reliable than a machine, thought Peter. But, truly, it was a remarkable sight. The little ark was placed on the car — not a hard matter, for she had no keel. The Moore family waved good-by to Peter and up they went, pulled slowly and steadily by a thick cable. Half-way up, they met a car carrying a canalboat coming down — the two helped to balance each other. Thus the little ark actually climbed 1398 feet up to the top of the mountain ridge. Then it was lowered by another cable down 1071 feet where it again slipped into the waters of a canal close to the upper Conemaugh River. Phoebe Moore sighed with relief. And John Moore looked up the tracks,

up at the mountains over which they had climbed, and wondered at what little machines could accomplish!

In the meantime Peter and Jan made their way up a steep trail which led up and over the mountains. It was hard work — particularly for the big horse. He was no trail horse and his big sides heaved with the strain of the going. Peter walked in front with the halter in his hand, except when he mounted to ford the streams. His boy's heart was glad to be off in the woods with his beloved horse and his boy's feet made light work of the climbing. So steep were the sides of the narrow V-shaped valley up which they wound that only at high noon did the sun light the whole of its sides. Down the narrow valley frothed a stream, crossing and recrossing the trail. The water gurgled and danced against Jan's stalwart legs as with careful steps he waded through the lively water. It was quiet in the woods except for an occasional full-throated whistle of a bird or the flirt of a tail of a startled squirrel. The raccoons and porcupines had long since slunk away to await the dark of another night. It was sleeping time for the hunting animals. Below, growing more and more like silver threads, glistened the winding stream with the smooth straight canal running along beside. Peter would have whistled for joy had he had the breath.

At the saddle where the trail turned downward, they stopped. A great stretch of wooded, rolling hills with narrow silver streams in their deep cracks, and here and there the great dugout heaps showing where men were mining, and here and there a smudge of smoke showing where men were smelting or manufacturing. Peter ate a big hunk of Mrs. Moore's good bread with a thick slice of

cheese and a bit of cold scrapple, while Jan Kip at last was free to bite the luscious little shoots of grass and tender leaves at which he had been looking so longingly.

Down on the other side of the pass lies a new world — Ohio, Indiana, Kentucky, Illinois, the Mississippi — magic words, or so thinks Peter. And as the bread and cheese and scrapple slip down, wonderful dreams float before the boy's eyes. To Peter every step down the winding trail is a step towards his dream future. But to Jan Kip it is only a very bad and steep road which wrenches his heavy body! They find the family there before them, the ark floating quietly in the new Allegheny Canal, a hot dinner ready for Peter and hay in the manger for Jan Kip.

So the mountains were crossed, the mountains which stretched hundreds and hundreds of miles and cut off the opening — the mountains, which blocked the short route from the Great Lakes to the ocean by Philadelphia, the mountains, which opened to the north to let the wheat-laden boats of the West slip through into the Erie Canal and float down the Hudson to New York, the mountains, which held untold wealth of coal and iron, the mountains, which controlled that part of the world and determined the lives of the men who would live there. So the mountains were crossed.

So the Moores had gained to the other side — to the new world of the West. But their adventures were not over. For it was a journey of some four hundred miles from Johnstown, where the ark was slipped into the Allegheny Canal, to the Illinois prairie where the family finally settled. Pittsburgh, with its furnaces and factories, its chimneys and its smoke, was already a thrilling sight. The trip down the canal beside the Conemaugh, Kiski-

minetis and Allegheny Rivers to the Ohio River, down the Ohio to Illinois, was one long adventure. But it was safely accomplished, and before the winter snows fell on the prairie John Moore with the help of Peter and his neighbor Ephraim Crane had a house, and a small barn ready. Till then they used the ark. For Jan Kip had pulled it when the water was high up the little stream which ran through the new place. And when the water fell, the stranded boat still made a good home for family and horse till the new quarters were ready. Then it was hauled into the middle of a meadow. There for years the old ark was the favorite playground of the children. Melissa still played Jan Kip on deck, and William pretended he was Peter and plunged headlong into the meadow grass to rescue the spluttering Melissa.

WITH TREASURE-FISHERS OF THE SEA

THE PEARL DIVER FINDS HIS BIG PEARL

by Victor Berge and Henry W. Lanier

WE picked up and sailed away from Run. Instead of heading for Banda, however, we held southerly and then straightened out to the southeast, across the Banda Sea, toward Manuk and the Kei Islands. Then Uncle, my Chinese benefactor, sprang his big surprise on me. We had talked so much by this time, and he had picked up so many English words, that we could understand each other much better.

It seemed that some months before, while he was on a trading cruise among the Arus, south of New Guinea, he had come across a pearling lugger wrecked on a reef down toward Enu. She belonged to an Australian pearly, who had a crew of Japanese and Filipinos; between them they had managed to pile her up in a blow. This captain had gotten ashore, and he was disgusted and wanted to sell the lugger and his diving gear and everything else.

Uncle was a shrewd trader. He kept hanging around, for he saw there was a deal coming, and he'd long wanted to have a diver working with him. He asked a few questions and showed no particular interest. Privately, though, he sent out some of his boys who were extra good seamen; they reported that they could easily salvage the lugger.

So presently, just as he figured, this skipper became im-

patient, white-man style, and Uncle picked up the whole business — for next to nothing, I fancy.

Then he set these black boys to work. They patched her roughly, pumped her out, floated her off the reef, and sailed her up to the Kei Islands, where he had decided to have her rebuilt. . . .

. . . There was a lot of work on this lugger; Uncle had returned to Banda, left the diving outfit there, and gone on to Surabaya to stock up — when I dropped into his hold out of nowhere.

Now the repairs were completed. We were bound for the Keis to take her over.

"I give you one boat — nice boat," said Uncle. "Little boat, but nice."

He went on to repeat his former offer:

"You catchem pearl; I catchem shell."

This was a mighty generous bargain. The total crop of shell each year from Malay Archipelago waters will average something more than twice the value of the pearls. But here I was, an ignorant boy of eighteen, just having picked up a little about diving, and contributing nothing except that little and my energies. He didn't figure it that way either: to him shell was a standard article of commerce, suitable for a steady trader; pearls were more a matter of luck, almost a gambling proposition — and I fancy he carefully separated his gambling, of which he was so fond, from his business.

"Mebbe so you catchem big pearl," he would say; and, keen bargainer though he was, I knew he was really thinking about me and planning for me, just as if I were his son.

You can guess whether I was excited as we slanted down with a fair wind on that two-hundred-and-fifty-mile run to the Kei Islands!

Most of my time was spent in trying to picture this boat. My mind went back to that beloved sailboat on the lake at Ockelbo, which had given me my first glimpse of what ocean freedom might mean: naturally, I figured this lugger as something between that and the smaller craft I had been seeing lately. That passage was nothing but successive visions of this rescued lugger.

What I was not prepared for, though, was her beauty.

We reached the island, and I didn't lose one minute in getting alongside this boat, lying there in the little cove where they had rebuilt her. You know how it is with boats — just as with women: some have all the virtues, you can depend upon them, they're all right, but they don't move you. And others . . .

This was a twelve-ton lugger, one of those magnificent boats they lay down at Thursday Island, where they understand the requirements of the work. There's no stauncher craft in the world than a proper pearl-lugger: you can go anywhere in her, if there's a skipper in charge who understands her and the islands.

They hadn't painted her yet, but she was all completed, everything nicely finished, spick-and-span, a craftsman's job. She sat there in the water, absolutely still, but with life in every line of her, ready to go.

And the fellow who originally built her had put that something extra into her lines which you can't describe: she was just a thing of beauty. The first sight of her made my heart beat hard. No explanation for that. As I say,

it's the same way with some women: the minute you lay eyes on them something happens inside of you. That boat was mine, right away.

We set to with a will, and I drove those fellows hard. It wasn't long before we had the lugger all painted, stores and gear aboard, ready to sail on my first pearlizing trip.

Uncle gave me his own Number One boy, an excellent seaman. Also we had the luck to pick up an experienced diver's tender, who had been at it for years and years. At least, I thought at the time it was plain bally luck: looking back, I more than suspect it was one more instance of the careful, affectionate foresight which that wise old Uncle was ever employing on my behalf. You couldn't fool him about many things; I'm sure now he had seen through all my boy's bluff about diving and had been looking about in a quiet way for some expert who could give me a few tips without seeming to.

Certainly no one could have picked a better helper than this chap. He was from Amboyna, up next to Serang (Ceram) there, where he'd been born — the capital from which the Dutch Resident rules all this part of the Dutch East Indies. Pretty old, he was, but he was good: he could still go down himself in shallow water, but if a man starts as a tender he almost never becomes a diver: he sees too much of what the diver goes through and is apt to say, "Not that." His great value to me was that he had known before I was born all the little things I'd been painfully trying to worry out for myself. I was no mechanic, whereas this chap could take a pump to pieces, grease and oil it, put it together, and keep it running perfectly. He understood all about those bothersome pressure gauges;

every piece and gadget of a diving outfit and how it should be used; all that accumulated mass of practical knowledge, for every day and for emergencies, on which a man's life may depend at any moment in that work. Undoubtedly it was through his expert coaching and his masterly handling of details that I never had a serious accident.

That man was my right hand from the time he joined.

He could handle a lugger too, taught me a lot about that in those tricky waters, full of currents and reefs and whipped by sudden squalls. It was a sight to see him tending: nobody could talk to him then, unless it was orders; he took his job too seriously, knew what a slip on his part might do. Someone who knows must have trained him and made a job of it. Except my friend Ro, he was the greatest tender I ever had in all these years.

With this most satisfactory helper I made some trials at greater depths, down to seventy or eighty feet. Everything went like clockwork. No trouble. So we were off for pearls and shell.

My tender had some slight knowledge of shell beds over by New Guinea, but he had been there only once, when he was a boy, and his information was sketchily vague. That's a wild coast of Dutch New Guinea, hardly a settlement for hundreds of miles, and though we were only two or three hundred miles off we could find nobody who was acquainted with it. So finally we just set out, on a straight course past the northern tip of the Arus.

The northwest monsoon was blowing steadily now; that was just right for us; the little lugger waltzed us across in fine style, and I grew prouder and fonder of her every day.

Quite a way off shore, my tender announced we were

over a bed. He had seen some small shell which he knew indicated there was pearl shell around.

I was over the side and down just as quick as we could get things working. I still had to find my first pearl shell. And that's one of the experiences a man remembers.

My eagerness soon had a check. I walked about, looking with all my eyes, moving from place to place over the uneven bottom: not a sign could I see of anything like pearl shell.

Somewhat taken aback, I went up at the end of my time. My tender insisted there ought to be shell somewhere around. After a rest, I journeyed down again and scoured all about. No results whatever.

The time that followed was maddening. For two whole days I stuck to it, drifting behind the slowly moving lugger, looking, looking, looking, exhausting my strength by my efforts, cudgeling my brains for some explanation. No use. I was somehow completely convinced the place was right: there must be shell somewhere, yet all my senses failed to discover it.

I was down there, pretty well in from disappointment and fatigue and humiliation. It was my third day and I was sitting on a lump of coral. What was I to do?

A few paces ahead of me there was one of the thousands of patches of vegetation. And as I stared at it, feeling I was about at the end of my courage — something moved in it. There was a flash of a silvery color.

"What is that?" I exclaimed aloud, jumping to my feet.

I hurried to the spot. There was a big oyster in this patch, its shell so covered with growth and seaweed an untrained eye could pass within a yard of it and never

pick it out! What I had seen was this oyster closing up, with just a gleam of its shell's sacred inner surface.

From that instant I was like a blind man whose sight has come back. Spotting that one oyster opened my eyesight. I stood there, looking around.

There was pearl shell all about me! Big fine oysters such as I must have passed hundreds of times in the preceding two days. I became suspicious of everything. "They may have some other tricks, these beasts," I thought.

Anyhow, I was on to this one of hiding from a beginner. It didn't take me long to send up some baskets of these elusive oysters.

Another step in my initiation came when, on the lugger's deck, I opened this first batch of shell. You can depend on it, no one else was permitted to perform that operation. I was trembling with excitement so that I nearly cut my fingers off with my big sheath knife. There is, of course, quite a knack about it.

In the morning, when the sun beating down causes the valves to loosen, even gape a bit, you hold one of these big shells firmly on something solid, pick out a place, and jam your knife right down into the main muscle. The oyster contracts to one side; you cut clean down, give a sideways jerk, and disconnect it at that spot. The two valves spring open, for there's a black elastic ligament at the hinge which operates just the reverse way from the central closing muscle.

Then you flip the oyster back and forth. As a rule you know right away whether it has anything for you or not. It is passed on to a man alongside, or opposite, who removes the creature and carefully feels about the lips; once

in a while you hear him hiss — and you look up and see him taking out a little pearl. But in decent-sized shell it's surprising how probable it is to pick out everything right away.

Either the pearl will be in plain sight, often loose, or if it's of any size you'll notice the lump under the oyster's skin. Once in a while a big pearl will be located 'way in the middle; these and the little fellows are found by the helper.

As I say, I was shaking with excitement when I started in. But you don't remain that way after you've opened a dozen or so and found nothing. As I tested one after another, all without result, I became anxious. Where were these bally pearls I had been told about so often?

I stuck to it, opening and opening, there on the lugger's deck, till I had finished the entire first batch I'd brought up.

Not one single pearl did I have to show for the lot! That was a facer. I thought of my deal with Uncle — shell to him, pearls to me. "Gee!" I said to myself. "I'm out of luck at this game."

Still, I had such complete confidence in Uncle that I was certain it would somehow work out all right. Naturally, he couldn't just present me with a boat and crew and gear. I didn't begrudge him one ounce of all the shell he might receive under our bargain. But I did want some evidence that my end wouldn't be all hope and moonshine. Well, tomorrow would be another day. We'd see.

Next day I fetched up a big batch — there was plenty of shell, now that I'd acquired fish eyes and could distinguish it. More disappointment, as I kept opening and

drawing blanks. At last, however, I gave a yell as I picked out an ugly baroque. It looked like nothing, and it was worth little more. But it was, generally speaking, a pearl. And it was the first thing I'd harvested from the sea which really belonged to me. Moreover, it was a promise of something better. My courage and resolution all came back. I was willing, even eager again, to see this thing through: out of enough chances, I must draw one lucky number sooner or later.

I kept on working, fishing up oysters, opening. A few small pearls and some seed pearls began to make a sort of show in my box. The heat was terrific at times, and there would be days when I'd have to rest up. I could see this life I had entered on wasn't by any means a soft job. . . .

. . . We worked around here for a while, and then my tender told me we'd find better natives farther south; so we shifted down quite a distance, where the people were all right and it was easy to obtain water and fresh stuff to eat.

There were plenty of shell beds too, and I kept doggedly at my job. The northwest monsoon came on, and there'd be days when we couldn't fish but would have to run for shelter into some river mouth or behind a barrier reef. It was tough enough at times; I was pretty well fined down by the constant hard work, and no longer thought of diving as merely a dreamy occupation among beautiful wonders.

Moreover, at the end of four months, there was enough to show for my end of the expedition. Uncle would come out well, there being a very satisfactory pile of good shell in the hold, worth somewhere from eight hundred to a thousand dollars a ton.

Then, one morning, luck came to me again.

There was quite a rough swell on. The lugger was pitching about, rolling this way and that.

I was opening a batch of oysters on the deck. It was a job, to be got through with. By now I could do it like a machine, thinking about something else. A man would watch closely, though, without realizing it, no matter how many thousands of times he'd done the same thing before.

Automatically I slipped in my knife, flipped the oyster over. The lips sprang apart. Something rolled out and dropped to the deck. Something big. A Big Pearl!

The lugger heeled over with a wave. The pearl rolled down toward the gunwale.

Like a cat I sprang at it, before any conscious thought came to my mind. I landed on my hands and knees and grabbed it, a second before it would have gone overboard again.

Trembling as if I had a fever, I looked at this beautiful thing in my cupped hand.

It was a magnificent specimen, not round, but a perfect oval; there was a tiny flaw or two, but the luster was superb. And the size! Sixty grains it proved to weigh — the largest and finest pearl I have ever found in my many years of fishing.

My tender was not far off, feeling out the opened oyster. He was stirred up too.

"Big!" he said. "Big pearl. Me never see like that. You stop. No fish more now. Finish."

But I hardly heard him. I sat there for hours, holding this precious thing as if I were nursing a baby (that's what pearlers call them, "babies") and fairly seeing visions.

I knew it meant a sum that was a fortune to me; and

my mind shot along all sorts of possibilities: going back to Sweden to show them I was somebody; becoming very rich, if I could find such treasures as that, and then doing just whatever I felt like; many boyish projects. But chiefly it was the sheer wonder of the pearl itself that fairly hypnotized me. Those exquisite gems are at their finest when they first come out of the ocean depths; and the color, the translucence, the sensitive living delicacy of it cast a sort of spell over a man.

I put it into a tobacco sack — the best jewel bag I had — and fastened it around my waist, next to the skin, with a belt made of a pajama cord. Every once in a while I'd have to pull it out and look at it again to be sure it was as great a marvel as I remembered. Always it was.

My tender was right: it was time to turn back. The weather was getting impossible here. Besides, anything else was an anticlimax until I did something about this prodigious find. . . .



(Note: If you enjoy reading this story of pearl fishing, you will be delighted with the stories in: *Pearl Diver*.)



FINDING TREASURE IN A SICK WHALE

by George F. Tucker

I HAVE said little about the cook, who was so kind to me the first morning at sea. He was always pleasant and obliging, and he used to say that he only regretted

that he couldn't prepare for me some nice little bits like those my mother used to cook for me at home. One day I said to him:

"Why is it that you scrape out the plates so carefully and then put the scrapings into a big cask? Why don't you throw them overboard?"

"Because I'm a money getter. Don't you know what slush is? Why, it's the scrapings of the plates. I've heard it said that they use it on some ships to slush the masts with. Not on this vessel — worth too much. I put it in casks and there it stays till the end of the voyage. It don't rot, gets sweeter all the time. When voyage is over, sold to be made over, and out comes beautiful, rich lard. Goes to the best restaurants and brings big prices. I get my lay in the slush."

"I never heard of such a thing," I declared.

"I make out of it in another way," he continued.

"How's that?"

"Why, I scrape the plates so carefully that often they don't need washin'; so I save labor."

All this was said seriously; and I have to say that I was not disturbed. I thought it a joke that the rich should regard as a luxury what we poor sailors discarded as worthless. And then I thought that, if the story had been told to me before I left my father's roof, I should have been inclined to disbelieve it."

The cook continued:

"Now that we've got fresh stuff on board, let me tell you this. You know that the cabin gets the best, the steerage, where the under officers, boat-steerers and carpenters eat, next best, and the forecastle last. Nevertheless, you folks will get some of it, and I'll do my best to

make it taste right. Now let me tell you that in this warm weather the forecastle is no place to eat in, so I've asked Lakeum to let me serve the boys on deck, and he's given his consent, and this will be done so long as the weather's warm. After that back to the forecastle. You boys will sit on hatch and windlass, and I'll serve the food in a new way. There'll be two tubs, one of them called the meat kit, into which I'll dump the boiled meat, and a second, without any name, into which I'll dump the vegetables. Then every man will help himself. Coffee in the mornin' and tea at night, I'll serve in buckets. The fruit they let the boys have to eat they can have as they please, so long as it lasts."

The adoption of this new method seemed to cheer the men up. One advantage was that we were disposed to converse more than we did in the gloomy forecastle, and pleasantries were indulged in. The good manner noticeable in the forecastle was not discarded on deck. Food may not have been partaken of according to the requirements of polite society, but each had due regard for the rights of others, and there was no sign of greediness.

I have said that I was not a great success at the mast-head, and I repeat it. My vision may have been poor or I may not have had very good luck, but good fortune came in an unexpected way. A few days after leaving the island I stood in the hoop, looking out on a sea that was hardly moved by a ripple and on a sky that was clear of clouds. I think I have said that a whale will suddenly appear when for some time not a spout has been seen from the ship. The belief is that the whale must have sounded at a place a long way off and then made great speed under

water. While I was scanning the horizon suddenly my attention was attracted by a spout not more than two hundred yards away, and I shouted "B-l-o-w-s, b-l-o-w-s, b-l-o-w-s. There he breaches! There he white waters." I saw just enough of the whale to convince me that he was a large one.

Silva's boat was the first to take water, and that boat was the one which got him. When the whale was fast to the ship, Silva said, "I never see such a whale in my whalin'. He's the biggest fellow I ever see; he'll make a good deal over a hundred. When we struck him he didn't seem to show no spunk. I never see a whale with such weak flukes. He didn't make much more suds than a wash-woman makes, and, when he sounded, it wa'n't no more than a boy divin'. The line went out so slow that you'd think there was a child pullin' at the other end, and we didn't lose no more than eighty fathoms. And he ain't no dry skin. His jaws is all perfect. He ain't been fightin' with no whale. There's somethin' the matter with the big fellow, but I don't know as we'll find out."

Turning to me, Silva said, "See here, young fellow, I guess you've got ahead of all the boys. Seems to me you'll be sportin' a gold watch when you get back to New Bedford."

One may fancy how pleased and elated I was. The whale was the largest we had taken, and it was possible that we might take one larger, but not very probable. The blubber peeled off in splendid strips and appeared rich in oil. The general opinion was that the whale would yield at least a hundred barrels, and one man's estimate was a hundred and twenty.

"I've sailed the seas most of my life and the largest

sperm we ever took made a hundred and ten," said one of the old sailors.

When the blubber was stripped off and the head severed, the body rolled over; and then a man, who had a spade in his hand, uttered an exclamation.

"What's the matter?" someone asked.

"What's the matter? Look at that big bunch." He pointed to a spot where the intestines were greatly swollen. "There's something in there, sure. I don't know what it is. I never see anything like that before."

"Well, I know what it is," said the captain, who was passing. "Give me that spade and I'll show you what it is, even though it's the first time I ever saw anything of the kind."

The captain pressed with the spade, and the intestines opened and disclosed a large substance, which he declared to be ambergris. There was great excitement, and the buzzing reminded me of a gathering of gossips. While deference, of course, had to be paid to the captain, yet everyone had something to say about the preservation and uses of this strange and valuable secretion. The truth is, no one knew anything about ambergris, for a man might spend his life on a whaler without ever seeing a whale which carried a pound of the substance. The captain ordered a large tub to be brought. This was lowered, and a couple of sturdy Portuguese descended and lifted the mass into the receptacle. When it was landed on deck the buzzing was resumed as the inspection proceeded. Everyone had to feel of it. It was hard and apparently perfectly formed.

Now the truth was, the captain didn't know any more about ambergris than the foremast hands. Addressing

Lakeum, he said, "We shall have to take this stuff home with us, for it's so valuable I wouldn't dare ship it, and the question is how best to take care of it. I suppose the best thing to do is to put it in a small cask and head it up and then put the cask into a bigger one filled with water. This will tend to keep it cool and preserve it. What do you think?"

"This is the first ambergris," said Lakeum, "that I ever saw, and I confess I don't know how to treat it. What do you say if I ask the crew if any one of them knows anything about taking care of it?"

The captain assented. Only one man responded to the inquiry. It was Kreelman.

"I never was on a whaler that took any ambergris, but a man who was on the *Tiger*, which took a whale in 1848 which had a lump that weighed a hundred and fifty pounds, told me that they made a great mistake. He said that they kept it moist and it kind of spoiled, and he said that, if they had kept it dry, they would have got ten thousand dollars more for it than they did."

The captain said nothing, and the men were ordered to their tasks. His expression was not pleasant, for it was evident that he did not like a statement, apparently reliable, which ran counter to his views, the views he had just expressed. But it is a fact that the ambergris was kept dry during the remainder of the voyage. It took over three days and nights to cut in, tryout and boildown our leviathan, and stow down the oil. Just before the figures were announced, there was a resumption of the guessing. The best guess was a hundred and nine barrels; the actual yield was one hundred and eleven barrels and four gallons. After the cleaning up, the whale and his product

constituted the topic of conversation among the crew for a long time.

In the social hour they made all manner of fun of me, or rather of the prospective watch. One said that the watch would prove to be second-hand; another that it wouldn't go; a third that when it was wound the noise would be as loud as that made by the winding of a clock; and a fourth that watches of the kind were sold at five dollars the gross. They evidently endeavored to draw me out, but I was silent. Then they took up the ambergris and, in a serious way, began to discuss its value and uses. Several men thought that it was the perfume itself, but Kreelman insisted that it was the substance which prevented evaporation. Then tales were told of the fabulous sums which druggists had paid for the substance and more fabulous tales about the size and weight of various lumps of the article. Then someone asked:

"Does Fancy Chest get the ambergris beside the watch?"

One would think that such a foolish question would only have elicited a laugh; instead, it gave rise to an animated discussion.

"If he does get both, he'll be a kind of Crocus," answered another.

"And who was Crocus?"

"He was a rich man — lived in New York — had more money than any other man in the world."

Though I was a boy, I had seen enough of my companions to know that any proffer of enlightenment would be resented; so I did not tell that Croesus was intended.

In answer to the first question, one of the men said, "This is the way I look at it. If sightin' the biggest whale

wins a prize, then the ambergris in it, which is so rarely found in whales, is a prize also and belongs to Fancy Chest."

The countenances of most of the men betrayed anxiety, but the expression changed and there was a roar of laughter when Ohoo said, "If Fancy Chest get watch and ambergris, den he get whole ting — de blubber, jaw-bone and teeth. Why not? Dat ain't no common sense."

The discussion now went on in a milder way and was quite prolonged. It ended with the emphatic statement of Kreelman:

"Everybody, from captain down, has shipped on a lay. We all have our lay or share in the whale, and everything in him. If Fancy Chest shipped on one one-hundred-and-eightieth lay, that's his part of the ambergris, and that's all there is to it."

There was now general acquiescence, and I silently concurred.

The next morning I was in the crow's nest and the Gay Head Indian was, too.

"I see somethin'," he said.

"Where?"

"Off there on the weather bow."

I scanned the horizon earnestly and then asked, "What is it — a pod or a single whale?"

"It ain't no whale. Can't you see it — just a faint little thing?"

I regretted my defective vision. The Indian leaned forward, showing by his attitude and fixed look that he was intensely interested. I heard him mutter; and now I, too, was greatly interested. I fancied I could see a faint

outline. The Indian renewed his muttering and suddenly broke out, "Boat ahoy!"

Up came the captain's voice, "Where away?"

"Three points on the weather bow, sir. Looks like a whaleboat."

It was almost time for the Indian and myself to be relieved, but fortunately we remained aloft long enough for the Indian, at least, to make out the object and announce the situation.

"Whaleboat, sure," he said.

By this time the object was plain to me and I was soon able to make out a boat. The Indian kept gazing intently and began muttering again. Before long he shouted for the captain's information:

"Only four men rowin'. Looks like one man hurt."

When we descended, we found the carpenter out with the medicine chest. It seemed to me as if time never passed so slowly. Did the boat belong to some vessel which had suffered shipwreck, and had its occupants been forced to resort to the awful expedients of famished sailors, or had it merely lost its ship and been only a few days astray? This last conjecture was the more probable, as we were cruising on a whaling ground, and, though it was of vast extent, it was rarely traversed by merchant vessels. As the boat came near us, the ship was hove to. The Indian was right; there were four men at the oars, and the man not rowing was bent over as if he had been injured. To the captain's hail the reply came from the man with the steering oar:

"Boat of the bark *Magic* of New Bedford — struck a whale late yesterday afternoon. Man's arm caught in

warp and injured. Warp cut, lost bark, been out all night."

The injured man was the first to be helped aboard. He appeared exhausted and was evidently in great pain. It is wonderful how gentle and tender rough men can be when their services to a sufferer are suddenly invoked. The man sat down on the hatch and was first given a generous drink of New England rum. Then the captain and carpenter proceeded to relieve him of his jacket. This was done very slowly, and gently done, too. Even then the patient winced and his face bore witness to the pain occasioned. The garment removed, an unpleasant spectacle was presented. The sleeve of the shirt was saturated with blood, which was dry, black and coated, and this evidently had staunched the flow as his companions in the boat had had no means of treating the injured member. The cook brought warm water, and the carpenter soaked the sleeve until it parted from the flesh. Then he severed the sleeve near the shoulder and the bruised arm was revealed. First, washing it so as to remove any lint that might adhere, and applying a lotion with the delicate touch of a woman, he then wound the bandage around it with the skill of a surgeon. The sufferer was then allowed the freedom of the cabin.

"A good job," said one of the sailors. "He done *so* well, Peter, why don't you have him take your tooth out?"

Peter, a good-natured foremast hand, was suffering from toothache and was very disconsolate. He said that he had never had any trouble with his teeth before, and that this was the first tooth to decay. I think he was pleased with the carpenter's medical proficiency and an-

ticipated the extraction of the tooth without much suffering. Peter was told to lie down on the hatch, and then there followed one of the most barbarous practices I ever beheld. Forceps were then in use, but the carpenter had none, and used the old-fashioned rollers instead. The tooth was really ground out of the man's jaw in a way that reminded me of grinding sausages. He belched like a wild animal, and the tears stood in his eyes. His glance showed resentment rather than gratitude. Yet the carpenter did his best with his old-fashioned implements.

Kreelman said, quietly, "Carpenter, surgeon, blacksmith, dentist, all one."

The mate of the rescued boat told an interesting story. In the late afternoon they had lowered, and, after a long chase, had made fast to a whale; a kink in the warp had led to the accident and the warp was cut. It was nearly dusk, and the ship was not to be seen. They took what they thought was the proper direction, but no lights were observed.

"If we don't pick her up today, we'll heave to at night and pick her up in the morning," said Gamans.

On inquiry, it was found that the *Magic* had made a fine voyage and was on her last cruise. This was pleasant news, and word was passed round that the men on the watch below might write letters to be taken by the *Magic*, if we were so fortunate as to gam with her. That evening our visitors were exultant over their successful voyage and made us feel rather small with our moderate amount of oil. One of the *Magic*'s men was very boastful, and described incidents in their voyage of an extraordinary nature, which did not lose anything, however, from the

man's telling them. After he had pretty well talked himself out, one of our men asked:

"What do you think your cargo will amount to? When we left port, sperm oil was the lowest it had been for a good many years, and your catch, I suppose, is all sperm. You ain't got no bone, and you didn't go in the Arctic as we are goin'."

"Well, our captain says it'll bring about ninety thousand dollars."

The man looked around with an air of triumph.

"Ninety thousand dollars is a good deal of money," he continued.

"Yes, it is, but we took about seventy-five thousand dollars of merchandise in a few hours, and we've been out from port considerably less than a year," observed one of our men.

The remark was greeted with a derisive laugh.

One of our visitors retorted, "It would take a good many months to get seventy-five thousand dollars' worth of sperm oil, and a good many weeks to try out and stow down."

"We've got a patent machine. We do it all in one job."

"Pshaw! That's nonsense."

"Men are pretty smart whalers," continued our man, "when they can pick out a whale that's got a lump of gold in him."

"You don't mean to say—" The man stopped.

"Yes, I do mean to say that we've got stowed away a lump of ambergris that's worth more than half your catch of over three years. Suppose we change the names of the vessels and call our ship the *Magic*?"

The announcement, coupled with the laugh which fol-

lowed, was too much for the visitors, and the conversation turned to other subjects — the common things which pertain to a sailor's life, such as the food, the weather and relations with the officers. When the crews of different vessels meet, boasting is inevitable. Kreelman said afterward that he never saw, at a gam, men so completely squelched as were the sailors from the *Magic*.

We hove to that night, as the captain said, and at dawn the crow's nests were manned by lookouts who were instructed to seek sharply for the *Magic*, although whales were not to be ignored. Soon a mastheader announced the top-hamper of a distant vessel, and, before long, the two ships were in a position to gam. The *Magic* dropped a boat and her captain headed it. When it came alongside he leaped to the deck and shook hands with our captain. The two men, who were old friends, conversed earnestly and there was something interesting and delightful in their meeting by chance, many thousand miles from home, on a great ocean, which constitutes a pretty large part of the entire globe. The captain of the *Magic* wanted the last news from home, and our captain gave him what little information there was. Then Captain Gamans remarked, "Now let me tell you the latest news of this vessel. We've got on board a lump of ambergris that weighs three hundred pounds, and it's well formed too."

"What good luck! I never saw a piece of ambergris in my life."

How often one man's good fortune is another man's discouragement! The visiting captain didn't feel like remaining any longer. He took our letters, exchanged courtesies, and departed. I watched the two boats as they put back to and reached their ship, and then, as the breach

between the two vessels widened, I was conscious of the recurrence of the feeling I had experienced when the *Seabird* dropped from her moorings in New Bedford harbor. The *Magic* diminished until it was only a speck. Then I thought, "In a few months she will drop anchor in the home port, and a large number of the officers and crew will be once more with family or friends. Long months must elapse before our return, and then there are the uncertainties of our calling — disasters or a broken voyage. Oh! for my father's kindly greeting, my mother's smile, and the little room which I abandoned for the sea."

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If you enjoy stories about sailors and whales, you should ask your librarian for *The Boy Whaleman*.

WITH THE NAVY

WINNING AN APPOINTMENT TO ANNAPOLIS

by Fitzhugh Green

CLOSE to midnight the reader moved his candle a bit nearer to the bed's head. Using his finger as a guide he followed again the final thrilling sentence:

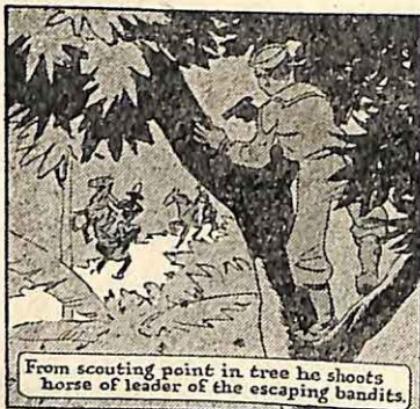
"... Having sunk three frigates and a brig, and with half the width of the South Pacific between him and his pursuers, Skipper Byng now dared risk attack the pirate stronghold."

After a third reading he rose to a sitting position. Such was his caution that not a creak came from the dilapidated old bed. Strangely enough he was fully dressed, this despite the fact that a moment before the bedclothes had covered him to his chin.

He pinched out the candle. Blowing would have made too dangerous a noise, and noises of any kind increased tremendously the danger of the moment. As yet there were no pursuers. But had there been, the luck of Captain Byng with half the South Pacific behind him was tragically impossible.

He tiptoed to the window. Through a crack in the shutter the street was faintly visible. It appeared deserted. He couldn't see the tall figure in dark clothing lurking behind the telegraph post opposite.

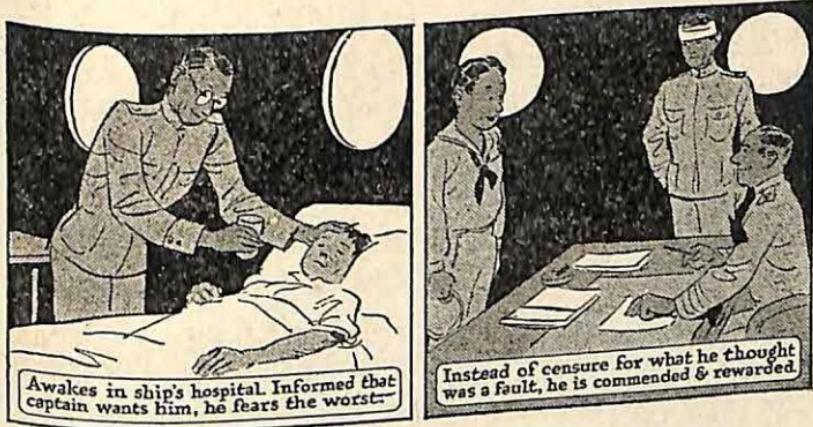
The tall figure was that of the Emmitsburg night patrolman. For a week this officer had noticed the flicker



of light upstairs in the house he now watched. Inquiry had told him only that this was the residence of the Poors, a new family in Emmitsburg. Anything new in the tiny village of Emmitsburg was a cause for suspicion.

Tonight he had determined to solve the mystery. So, having made the rounds of his regular beat, he returned and concealed himself behind the post. Within a minute after his arrival he was rewarded by seeing the light disappear. Then noiselessly the shutter opened. A shadowy figure emerged and lowered itself to a ledge beneath the window. It crept to a drainpipe a few feet away and slid to the ground with a faint thud. By furtive steps it passed through the little front garden and into the street. Twenty paces behind, the patrolman took up the pursuit. So far he had no cause for arrest. Also his detective instinct told him that greater possibilities of discovering crime lay in covering the full trail.

Near the lower end of Emmitsburg's main thoroughfare, a freight train delayed matters. As a light hung above the crossing, the fleeing figure shrank into the shadows of a near-by building. The policeman had just



time to see he carried a bag of some sort. Booty without a doubt.

The rumbling crashing train passed slowly. Its length seemed endless. Suddenly the green taillight of the caboose swung into sight. At the same instant the officer gave a half shout of dismay.

The figure had darted from its hiding place, leaped to the iron rung of a passing flatcar, and was carried into the darkness of the night!

Near dawn the train picked its noisy way through the City's freight yards. The single passenger slipped off in time to avoid the inquisitive crew. He was cold and cramped and hungry. But he didn't hesitate. Except for stopping twice and questioning pedestrians as to the route, he walked steadily until the sun was high.

In the busy center of the City he entered a massive stone building. On the second floor he accosted a man in uniform behind a desk.

"Want to enlist in the Navy," he announced briefly.

"Name?"

"Thomas Poor."

"Age?"

"Twenty"—he lied without hesitation.

The man behind the desk shot a keen look. He was trying the age of twenty on Tom Poor as a tailor would try on a coat. Stocky well-knit figure, it fitted. Heavy jaw and set mouth were those of an older man. Cold blue eyes between their narrow lids, short cropped hair, the whole bulldog-like pose were those of a man past twenty. Only the thumping heart beneath was unalterably young. It was invisible; yet hopelessly it beat and clamored to shout the truth:

"He lies—this Tom Poor lies! He's seventeen—he's seventeen—he's seventeen!"

* * *

Three months later to a day there was great excitement about the decks of the U. S. S. Alaska. The huge gray dreadnaught had anchored the night before in the blue expanse of Manzanillo Bay on the south coast of Cuba.

A blazing tropical sunrise had just fired the misty peaks to the north when the officer of the deck dashed to the gangway, shook his sleepy bugler, and ordered reveille blown at once followed by the assembly.

Uproar of boatswain's mates echoed along the lower decks.

"All—I hands on deck! Fall in the landing force!"

Without waiting to lash hammocks, six hundred men tumbled sleepily down and clambered up the nearest hatchways. Not since the days of war had any such alarm broken upon the brisk routine of peace.

"Fall in for muster!" shouted the division petty officers

and began to call in a hoarse monotone the lists of names belonging to their division or company.

"Tom Poor, seaman, second class."

No reply.

"Where is the beggar? Tom Poor!"

A lanky lieutenant strode up. "All right, Johnson," he said crisply; "I've excused Poor from this formation."

Having received a report of absentees, the lieutenant returned at a dogtrot to his stateroom where he found Tom waiting as he had directed.

"I was ordered to report to you here, Mr. Rudd," said the lad.

"Yes, Poor. I have picked you for a serious responsibility. I may as well trust you at once with the truth of this disturbance."

He turned to the open porthole and pointed to a saddle in the distant mountains.

"See that blurred line? That's smoke. An American sugar plantation has been attacked by bandits. The owners cabled to Washington for assistance last night. Twenty minutes ago we received orders to land an armed force and capture the criminals."

"But they've had all night to get away, sir."

"True, except that they are in such numbers that there may have seemed to them no need to hurry. We hope to surround them by dividing our force. Half will be sent up the river opposite us. The rest will land and make their way across country in order to cut off the bandits from escape by way of the railroad."

Lieutenant Rudd stopped, closed the door and went on in lower tones.

"You and I have a special job in the middle of things.

I have selected you to accompany me on a route midway between the two sections. We can follow a road that is visible for nearly its whole length from the ship. Our signals about the positions of the enemy will be repeated to the divisions on either side of us."

At this moment a messenger announced the Captain's gig ready for Mr. Rudd.

Half an hour after they landed, a hard climb brought them to a point from which the smoking ruins of the plantation buildings were plainly visible on the hillside about a mile ahead.

After a long scrutiny through his binoculars, Lieutenant Rudd turned with a smile of satisfaction. "They're still there," he said. "I can't see the men, but their campfires are quite distinct from the smudge of the burning buildings."

"Shall I signal that back to the ship?" asked Tom. At a nod from the officer he began a swift series of movements with two small red flags.

"Pretty good at that, aren't you?"

Tom colored slightly. "I try to be," he said after a pause.

"That's why I chose you, Poor. You have impressed me as trying to be good at everything I set before you. Must be the way your mind works. Or maybe it's got to do with the reasons you had for coming in the Navy."

With one eye on the Alaska for a signal Tom made an effort to return the confidence of the older man.

"Guess it's the reasons you speak of, sir. I ran away from home to enlist in the Navy. I had to go to sea. Seems kind of in me. 'Course I used to be all for this pirate stuff you read about. But the country's coming to

be a great sea power and that means law and order. Merchant ships are bound to be monotonous—same routes all the time, and all that. So I took the Navy. Then—”

Tom broke off abruptly with a sharp exclamation. One flag he thrust out at right angles to his body and waved it rapidly up and down. A searchlight blinder flashed from the battleship's bridge.

“Combine—in—attack—at—ten—thirty,” he read.

“Gives us just time to make the encampment,” answered the other pulling out his watch. “Suppose they've figured the same for the other parties.”

From this point it was necessary to strike off across country. The road would not be safe, as parts of it were visible from the bandit camp. Also it was necessary that scouts be avoided in order not to give the alarm.

Tropical vegetation is a terrible tax on the walker's muscles. Rudd's long legs enabled him to avoid many of the snake-like vines and cacti that constantly tripped the sturdier-built seaman. On the other hand, Tom's rugged physique was not to be conquered by anything so trifling as a tropical jungle.

After a half an hour's struggle, Lieutenant Rudd stopped. “We've got to be careful not to lose our way here,” he panted. “Even with the sun and our compass we run a risk of running into an ambush.”

“Suppose I take a look ahead,” suggested Tom. “I see a tree from which I may get a pretty good squint at the neighborhood.”

“All right, but be back inside of ten minutes, as we have no time to lose.”

Tom's guess was correct. From the tree he could over-

look not only the plantation enclosure, now a smoking desolation, but the thickly wooded area on either side. To his surprise he found that not twenty yards to the right of him lay an open trail.

He started down. As he turned, his big Navy Colt automatic caught on a limb. In the few seconds of freeing himself he chanced to take another glance at the trail. His heart leaped.

Four horsemen were coming down it in single file. Beyond a doubt they were the bandits. One was thoroughly drunk. All were loaded down with parcels and bags full of loot. Two had packages of greenbacks protruding from their pockets.

Tom thought quickly. The bandits were slipping through their fingers. By means of this trail they could elude both attacking parties and escape in either direction along the coast. It would be a good fifteen minutes before the main forces would even reach the camp. And even then they would be of no great help unless they knew exactly in which direction to continue the pursuit.

There was but one thing to do. Tom drew his gun from its holster and cocked it. Using the crotch of a limb he took steady aim and fired. The leading horse reared with a loud snort, balanced for a moment on its hindlegs, and fell with a crash into the growth that bordered the trail.

Instantly the other riders swung off the open way. Tom could hear them floundering about in all directions. His single shot had thrown them into a panic.

Then a second shot rang out. It was in the direction of Mr. Rudd and reminded Tom of the predicament his

impulsive action might have imposed upon his companion.

A horse screamed. Shouts in Spanish came from all sides. There ensued a tumult of horses and men scrambling to avoid the unseen attackers.

Then to Tom's great satisfaction he heard the noise subside in the direction of the plantation. He clambered down and rushed back to where he had left the officer. Tom's heart stood still at what he saw.

Lieutenant Rudd lay on the ground face up. Blood was streaming from his mouth and nose. His white uniform was torn and dishevelled. No doubt he had been set upon from behind and left for dead.

With his neckerchief Tom bound up the wounds as best he could. Though he could hear a faint heartbeat he was by no means sure that death was not very near to the victim.

The chance that his companion might be saved by prompt medical attention left no room for debate. There was only one thing to do; take him on to the impending battle and trust to luck that the doctor of the landing force would be available.

Tom's unusual strength came vigorously to his aid when he swung the limp body over his shoulder. At that he staggered as he made his way up the narrow sandy trail. Sweat poured down his arms and legs, and he was conscious of an increasing throbbing pain in the back of his cramped neck.

Twice he put down the body to reconnoiter. Suddenly, he realized the time for attack as set by the Alaska's signal had come and passed. Could he possibly have read the

figures wrong? The thought startled him. If so, his mistake had precipitated the bandits' flight and possibly cost the life of his superior officer.

Then, without warning, a fusillade of shots broke out ahead. There were shouted orders and yells of terror-stricken men mingled with a great stamping of horses' hoofs. The battle had begun!

Hastily placing the body in the shelter of a large tree, Tom crept cautiously ahead. Gun in hand, he was ready should the natives make a rush in his direction.

Suddenly as it began, the firing stopped. Tom waited for a long minute to see if it would begin again, then ran back for the unconscious man. He arrived at the plantation clearing just in time to see the begrimed and heated landing force shouldering their smoking arms and falling into ranks.

"A doctor!" he shouted. "Quick! Here's a wounded man!"

The last words trailed on his lips. The ranks of dirty white uniforms faded into a gray smear. Then, quietly, Tom collapsed. The tropical heat and his superhuman efforts had been too much for him.

He came to in a little iron cot in sick bay, the battleship's hospital between decks.

"Here, lad, drink this," ordered a white-shirted steward. "And as soon as you feel right, let me know. The Skipper has sent for you to come to his cabin."

Tom rose to his wobbly legs. "Might as well go now," he said a little weakly.

"No hurry, son."

"No," wearily; "but I might as well get this off my chest. I gummed the game ashore, you know."

The steward opened his eyes. "That ain't what they say on deck," was his dubious comment.

Tom found to his surprise that Lieutenant Rudd had preceded him. Except for a head bandage the officer looked very much like himself.

Captain Barlow rose from his chair. "Let me congratulate you, Poor," he said, holding out his hand. "Proud to have you aboard."

"Wh — yes sir — but —" Tom faltered.

"I've told him all about it," put in Rudd.

"Yes," continued the Captain, "he told me that you singlehanded were responsible for our capture of the bandits."

"But I wasn't there, sir," Tom persisted.

"Guess you don't realize what you did, young man." The Skipper's smile was full of appreciation. "According to Mr. Rudd you dropped the leading scoundrel's horse just as he was taking his party to safety. Of course the others lost their nerve and turned about in time to fall into the hands of our main force."

"Except that one of them managed to creep up behind me," said Rudd, putting a hand to his bloody bandage.

Captain Barlow turned to his desk and drew an official document from one of the pigeonholes. He waved it at Tom and began:

"I have here a notification from Washington that I am to select a seaman for one of the yearly appointments to Annapolis that are reserved for enlisted men. According to Mr. Rudd you are the very one to fill the bill. You have a love for adventure that will make you appreciate life at sea. Further, you have ambition that will keep you out of mischief."

"And the loyalty," broke in Rudd, "that goes into the production of a successful naval officer."

Tom opened his mouth to speak. Nothing came. His cheeks burned.

"Orderly!" sang out the Skipper.

The marine sentry entered.

"Tell the Executive Officer that when he starts his school course this spring to add the name of Poor, Thomas Poor, seaman. Say I've picked him for Annapolis."

"Aye, aye, sir."

Tom stumbled out of the cabin. He felt as though he were walking on air.

The two dreams of his life were coming true: he was going to get a college education and he was going to sea!

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If you enjoyed this adventure of Tom, you will enjoy reading the whole book: *Won for the Fleet*.

WITH CLIPPER SHIP AND STEAMBOAT SAILORS

MISSISSIPPI STEAMBOATIN'

by Herbert and Edward Quick

A WAY back in the early days, a small low-sided steam-boat makes her way down the Mississippi on the Natchez-New Orleans run. She is a high-pressure boat, a new thing at that time. Her boiler in its brick work stands on deck, protected only by rows of cordwood. Smoke and sparks fly briskly from her single stack, and with each stroke of her engine a white jet of steam shoots from her escape pipe. Her flat, blunt-pointed hull has only narrow guards along the sides; her cabin and engine room take up almost the full width of the boat, leaving only footways to port and starboard. Forward and aft she is loaded with cotton. The cabin passengers are lounging in shady spots. The deck passengers, in among the cotton, have started a dance; the deck planks ring with the stamp of heavy boots. Rollicking notes of a fiddle float out over the water, with the singsongy cry of the caller and the loud laughter of the dancers. Forward, a fireman throws open the furnace door, cleans his fire, and pitches in a few sticks of wood. Another throws down more wood from the top of a pile.

In the little room that serves as an office, the captain is at work on his papers. His is an independent boat, he pays no royalty for the use of Fulton patents, and he runs

in competition with the pioneer Fulton line. A few more good trips like this and his boat will be paid for. If it weren't for the competing Fulton boat — the boat that sometimes noses into the landing ahead of him and takes the freight he has a right to expect! And where is that boat now? He has heard she will be delayed by a trip up a bayou — a trip he himself will make the next time there is freight there, or blow a cylinder head trying — and he expects to reach New Orleans first and get all the freight he can carry. The boat is almost opposite that bayou now. The captain stuffs his papers into a drawer and goes on deck to look for his rival's smoke.

There is the opening of the bayou, almost hidden in the tall cane, and — the captain turns loose a flatboatman's long and lurid oath — there comes the stack of the rival boat!

Captain, crew, and passengers watch by the port rail while the long, round-bellied hull of the rival slides out abreast. Suddenly a cloud of smoke is belched from her tall stack. She has come through the bayou at half speed; now they are firing up. On the independent boat, the captain snaps a word to the firemen, who already have their doors open and are working with bar and hoe. A big black man heaves; a row of wood crashes down before the furnace, is snatched up and thrown on the fire, and, as the door slams shut, the draft rushes through and up the chimney with a crackling roar. The boat paddles beat the water with more violence. The safety valve sizzles.

But faster and faster works the gallows-frame beam of the Fulton boat. A little plume of steam rises above her engine room, expands, and shoots upward in a trailing

cloud. Almost at the same moment the safety valve of the independent boat lifts and the excess steam hisses away. The captain wheels and rushes into the engine room, where the engineer and assistant are busy with oil-cans. Through the clank and groan of the machinery the captain shouts, frowning, "That Fulton boat is holding right abeam of us, and popping off too. We're wasting steam! Can't you make her hold a little more pressure?"

"The safety valve weight's in the last notch now," answers the engineer, as he wipes his hands on his legs. "But," he spits judiciously, "she might hold a little more; the boiler's nearly new."

"Well, then!" yells the captain. "Rig a line to the valve arm and tie it down. I'm going to beat that boat or blow up! Are you with me?"

The engineer grins and turns to the assistant.

"Rig that line," he says. "I'll keep her bearings cool."

The noise of escaping steam stops as the captain emerges on deck where he sees the rival boat still abeam; and as he looks, her plume of steam is suddenly cut off, floats, and disappears in the air while the long low boat goes on, throwing yellow foam from her bow. The captain mutters, softly but sincerely. It is a matter of firemen now, firemen—or boilers. He calls the mate and gives an order. In a few moments the mate appears on the forecastle. "Any firemen," he says, "that'll let a tub like that pass 'em aren't fit to rake out ashes. Keep her hot—keep her hot! Where's your resin? Make a fire, there! Keep her hot!"

Side by side, both seeking the strongest current, the two boats plow on down the river. The high-pressure boat is

normally the faster, but she carries the heavier load, and her square-built frame strains with the unwonted urge of her machinery, while the rival boat is built like a ship and engined with the finest machine of its type to be bought in America. If the race were upstream, it would be different; the Fulton boat would be held hopelessly back by the grip of the current on her deep round hull. Downstream, neither boat can make more than a small momentary gain.

As the boats run side by side, the crews yell at each other in challenge and derision. Their voices are hardly heard above the noise of the machinery. An emigrant, standing on a pile of cotton, shouts and holds up a ten-dollar bill. A planter, on the upper deck, cups his hands and offers to bet anyone a thousand dollars that his boat will pass the Red Church in the lead, and another thousand that she will be the first on the levee.

On the independent boat, the captain stands beside the pilot at the wheel. "How about the old cutoff behind that island?" he asks. "The Fulton boat can't make it; she draws too much water. Let's see—current in her favor, distance saved in ours—it would put us a mile or two in the lead. Do you reckon there's water enough for us?"

"I reckon," says the pilot. "Put a leadsmen on the bow and I'll try it."

At the head of the island, the boat swerves to take the short and shallow course. A yell of delight goes up from both contestants; on the independent boat they imagine themselves running safely through the shallows while the deep-draught Fulton boat takes the long course and drops behind. And on the Fulton boat they imagine their rival

stuck fast in shoal water, laboriously working off, wasting the time that might have given her the victory.

Aboard the boat in the shallows, beset with sand bars and snags, the race is no longer a matter of firemen and boilers. Race, boat and cargo, the lives of the passengers — all are in the hands of the pilot. Everything is staked on the skill and nerve of one man, backed by engineer and leadsman — the strength of the boat's hull timbers the only hope in case the one man makes a single mistake. The boat misses snags by inches. Her flat hull grates and drags over bars, her wheels churn up yellow mud, and the decaying smell of the river bottom mingles with the smell of burning wood and pitch and sizzling-hot oil. There are no more yells. The firemen feed their furnace in silence. Passengers anxiously watch the water. Overhead, the pilot stands at his wheel, nerves taut, hands steady. Above the clank of the machinery and the swash of the paddles rises the leadsman's call.

The boat slides over the last bar, into the open river again. All hands look astern, and as she clears the island they see behind them the rival, hopelessly outdistanced. Then the yells break loose, long loud yells of triumph. The people on the Fulton boat are too far away to hear them, but they sense them when they see the victor so far ahead. As the winners watch their beaten rival they see a jet of steam rise from her. She has released her safety valve, acknowledging defeat. The victorious captain orders the line taken from his own valve arm. He thinks, perhaps, of what might have happened if his boiler had not been strong enough to stand the pressure, but it is only a passing thought. He has beaten his rival! He will get the business at New Orleans! Everybody is happy. . . .

II

. . . On the levee before a Kentucky town, a gray-haired woman stood with a group of friends. She was wearing her Sunday-best hoop skirt, and looked worried. Held tightly in her black-mitted hand was a steamboat ticket to New Orleans where she was going to visit relatives. By her were several barrels of lard from the woman's plantation; she was taking these to market in the "big town down the river." She looked with misgiving at the white steamboat that was approaching. She never had set foot on one of them, and her friends had told her quite freely of the dangers of steamboat travel. Snags, collision, fire, the perils of racing with its risk of bursting boilers, all these had been dwelt upon with solicitous kindness. Really, the prospective first-time passenger was in something of a fret.

The boat circled in over the pale water and made fast to the levee. The timid old lady walked carefully aboard, and, after making sure that her lard followed her, sought the captain.

"Captain," she said, "I know anybody takes a chance when he rides on a steamboat, and I can take mine with the rest; but I want you to promise me, Captain, before we start, that you won't run any races."

"Madam," answered the captain, briskly, "I never race; that is, hardly ever, and I assure you I never do anything at all dangerous." The captain crooked a finger, and a steward disappeared.

"But, Captain," continued the lady, "you have no right to risk lives, just to beat some other boat, and maybe blow up a boiler or something, and I want you to promise. . . ."

"Ah, Madam," broke in the captain, "here is the stewardess who will conduct you to your stateroom. I promise you to do nothing dangerous, and I assure you everything will be done to make your voyage pleasant."

"Thank you, Captain," breathed the old lady in relief, "thank you, so much! I feel much safer now. Are you sure my lard is all right? And you'll take care of my trunk? That's good; now I'll go to my room."

Down the river steamed the boat, safely, sanely, and serenely, until one day a rival boat nosed alongside, and the firemen began to shake themselves, and the roustabouts began to yell. The Kentucky lady asked of another passenger, "Goodness me! What does this mean? Is it a race?"

"Yes," was the answer, "and if our captain doesn't look out we'll be beaten. Look how that boat is gaining on us!"

The Kentucky lady walked the cabin deck, twisting her fingers, watching the rival with bright eyes that made her face look younger as she watched. Suddenly she darted up the stairs to the hurricane deck. "Captain," she called. "Captain, you can take back your promise. Don't let that boat beat us! I come from where they race horses, I do; and I won't be beat!"

A smile crossed the captain's tense face. "Madam," he cried, "we're going to do the best we can."

"What!" cried the old lady, "and that boat is getting ahead?"

"Yes," was the answer, "she's putting oil on her wood — see the black smoke — and we haven't any oil. We can't beat her on wood alone; can't get the boilers hot enough."

Just then the stewardess ran up the stairs, a flatiron in each hand. "Cap'n, suh," she shouted, "if de engineeah want my ahns he can have 'em. Ah swo' las' time when dey got all rusty 'at Ah neve' lend 'em again, but Ah'll sand 'em 'nothah time befor' Ah let dat pack o' stovewood an' scrap-ahn beat me."

"Thank you, Lucy," answered the captain, "but he won't need the irons. He's got a sledge hammer and two kegs of nails on the safety valve now."

"Oh, Lawd!" wailed Lucy as she vanished down the stairs, waving her irons, "what kin Ah do?"

The old Kentucky woman faced the captain and stamped her foot. "Captain," she demanded, "where is my lard? I saw your boys put it down a hole in the floor."

The captain stared. "Your lard? Why, it's in the hold. It's perfectly safe."

"Safe!" shrilled the lady. "Safe! Oh—oh—oh! Captain, make your men bring up that lard this minute, and put it on the wood, and get your old boilers hot! If we lose this race I swear I'll never travel with you again! What are you standing there for looking at me? Make your boys jump, or I will!"

The captain called an order; up came the barrels to the forecastle. The fires leaped, faster turned the wheels. The boat quivered, strained, drew even—forged ahead. And up on the hurricane deck the old woman with glittering eyes stood abaft the roaring chimneys and laughed and wept, and shook her fists at the rival boat and waved her good-by. . . .

III

. . . The strain of driving a boat's machinery at its utmost capacity inevitably caused accidents. Fires were forced, boilers made to carry pressures beyond the danger point, engines driven with only one thing in view—speed. The most apparent risk was boiler explosion, but strangely enough instances of boilers bursting while a boat was running at racing speed are rare. Probably this is because engines, boilers, and furnaces were so well-proportioned with regard to each other that the engines could use up any amount of steam the hottest fires could generate. The greatest risk of all was fire, the terror of the sea, and equally of the rivers.

On April 9, 1832, the *Brandywine* and the *Hudson* were racing, thirty miles above Memphis. A strong wind was blowing. The *Brandywine* had been compelled to stop for repairs, and now, feeding her fires with resin, was overtaking her rival. Suddenly fire flared up on her boiler deck. Sparks had come up her chimney casings and ignited some crates of carriage wheels wrapped in straw. The crew threw the blazing crates overboard, but it was too late; the boat's woodwork had caught fire, and in five minutes she was ablaze from stern to stern. The pilot turned and ran her for the bank, but she struck a bar a quarter of a mile from land and stuck fast. The boat's yawl, manned by a crew untrained for such emergencies and overloaded by panic-stricken people, was swamped and lost. The boat burned to the water's edge, with the loss by burning or drowning of more than a hundred lives.

“FLYING CLOUD”

by Charles G. Muller

VAST heaving!”

At the mate's bellow, creaking of windlass and chantyman's song came to an abrupt stop.

“Anchor's apeak, sir,” the mate reported to Captain Creesy, whose critical eye was taking in everything on deck and aloft of *Flying Cloud*.

“Very good. Loose sails fore and aft,” the captain ordered.

Amid shouts from below and scrambling above, through rigging and over yardarms, Jabe Thompkins remained outwardly calm. But inside him, his heart thumped, and his hands ached to take hold and pull or haul alongside the clipper's crew. Instead, as the skipper had told him, he stood by, drinking in every bit of the action that went on around him.

“Sheet home the topsails!”

“Aye, aye, sir.”

“Boatswain, look out for those clew lines at the main.”

“Away, way, way, har,
We'll kill Paddy Doyle for his boots,”

sang the crew as they walked away with the three topsail halyards.

Jabe watched canvas being set fore and aft. He saw topsails, topgallant sails, royals, and skysails stretched flat as boards, inner and outer jibs run up, and sheets hauled to windward. Main and afteryards were braced sharp to the wind. Fore-topsail was laid to the mast.

Then the anchor came up to the rail and the clipper paid off, getting under weigh.

Jabe Thompkins watched the longshoremen rush over-side to their small boats, and he heard cheers from the crowd at Battery Park. The ensign dipped. And *Flying Cloud* started down New York harbor for Cape Horn and San Francisco.

His heart, that had been beating so fast, stopped almost dead — for Jabe finally was off on the greatest race of his life.

The letter that now was sending him thousands of miles over two oceans had arrived only two weeks before. Begrimed, delayed by Heaven only knows what mishaps, this long-awaited word from John and James Thompkins in California had cast consternation into the family which the two gold miners had left behind a year ago.

"They've got a good claim," said Jabe's father when he hurriedly had broken open the envelope and had run his eyes through the closely written pages. "But they're down to a few dollars. They haven't enough to buy themselves the mining equipment and supplies they need to work their claim. Listen to this."

Ezra Thompkins, tall and dour New York merchant, slowly read from his brothers' letter, dated January 5, 1851 from San Francisco.

"What with one thing and another, we can't possibly hold out past September 5. We are bound to take up our claim by then. In the meantime we will get along some-how. With stevedores and laborers getting from \$20 to \$30 a day, we most likely can make a living until we hear from you.

"But even if that rate of pay sounds like a good deal

of money, it actually is very little. Because we have to pay from \$40 to \$60 a barrel for pork and beef and flour! And \$4 a pound for coffee and tea and sugar. Cowhide boots out here bring \$45 a pair, even a pick or shovel costs us anywhere from \$5 to \$15. Medicines cost \$1 a drop. All because most people won't meddle much with supplies with everybody in the gold fields making from \$100 to \$1,000 a day washing out gold. Speculators in merchandise are reaping terrific profits."

The letter ended with a final appeal for help. "We're only two among thousands here that need money, so we can't get a cent of credit. That makes us entirely dependent on you for money to work our claim. Rush it! At once, or we'll all lose a fortune!"

Ezra Thompkins, finishing the letter, looked up at his tall son. The boy's eyes were shining, and he could hardly contain himself.

"Let me take the money out to them, Father," he said. "After I'd delivered it I could go out into the mining fields with Uncle Jim and Uncle Jack and help them. A thousand dollars a day! Whew!"

Jabe's father grunted.

"The thousand dollars a day would be fine. But," and he grunted once more, "you couldn't get there until too late. The clipper *N. B. Palmer* sailed two days ago, and she won't reach California until along about the end of August, close to the time your uncles give as the final date. There's no way to get it overland at all. I guess we've had our chance at a fortune and lost it, Son."

Jabe's blue eyes continued to shine. His voice was vibrant. "But it can't be lost," he declared. "There must be some way to get help out in time."

Tall Ezra Thompkins shook his head. "I'm afraid not. Around Cape Horn's the only route, and now it's too late. Besides," he said the next words slowly, "I don't know as I could raise enough money to be of any use. I gave your uncles practically every cent of cash I could raise when they started out last year in the gold rush."

Jabe waited to hear no more. Slipping out of his father's shop into the street that was lighted just enough to enable him to make his way, he headed for the Astor House. Inside his head, ideas were exploding like corn kernels in a popper. And some one of the ideas, he told himself, must be made to work.

Until Michael, the barman at the famous hotel, announced closing by calling for the last orders, Jabe sat quietly and listened to endless discussions and arguments that sea captains, merchants and shipbuilders carried on all about him. His ears took in everything, wisps of clipper ship news, bits of gossip of California, and sea-going opinions of men who knew what they were talking about when they talked of sailing ship speeds. All this Jabe absorbed. And then his idea flashed bright and clear.

A half hour later, to his father, he was letting flood out of him the reservoir of information he had accumulated that evening at the Astor House.

"We can get help out to Uncle Jim!" he cried exultantly as he flung open the door to his father's room at home. "I've found a way!"

Ezra Thompkins, impressed in spite of himself, listened to the words that poured from his son's eager lips.

"There's a new clipper coming down from South Boston to sail for California in about 10 days. She's called *Flying Cloud*, and Donald McKay, the famous builder,

turned her out. Captain Josiah Perkins Creesy is her skipper, and I guess you know what that means to any boat."

"Well," asked Jabe's father, "what good is all that to us?"

"Why they're laying bets down at the Astor House that this new ship will make San Francisco in less than ninety-seven days! She will be in California before September 5!"

"Less than ninety-seven days — nonsense!" Ezra Thompkins was emphatic. "Ninety-seven days is the fastest time any ship ever sailed to California. The papers were full of it last year when *Sea Witch* made that record passage. That won't happen again, let me tell you."

"But it will, father." Jabe's voice carried the conviction that he himself felt. "This new ship's the finest that's ever sailed under Grinnell, Minturn's red, white and blue swallowtail house flag. She's 225 feet long, father, with the sweetest looking bow that ever cut through water. They say her mainmast is 88 feet high and that she carries three standing skysail yards. Some of the captains at the Astor House say she's sure to break the record."

Jabe's father was shaking his head slowly, but the young man rushed on.

"Don't you see, father, that here's our chance to help Uncle Jim get to work on his claim? Ninety-seven days from June 3 will get me to San Francisco before September 5. We can make it just in time."

The continued shaking of the older man's head finally brought his son's words to a stop.

"Even if you could get to California in time," Ezra Thompkins was saying, "it wouldn't do any good, son."

Because . . . because, I haven't enough money in quick assets to stake your uncles. Everything I own is tied up — frozen solid."

Jabe's fist banged down on his father's desk.

"Then we'll ship supplies to them instead of money!"

The next instant, the youth's words again were tumbling out one on top of the other. "You can get all the goods they need in New York, and on credit. Prices are low here and . . ."

Jabe refused to be interrupted. "But the prices we can sell the goods for in California will be so high that we'll make a great deal of money — on top of sending to Uncle Jim everything he needs to fit him out for the gold fields. Don't you see?"

Ezra Thompkins did see. He also felt some of the enthusiasm that his son was feeling. Finally he nodded his head.

"It's worth a gamble, son. I'll see what can be done."

The next two weeks were among the most hectic of Jabe Thompkin's young life. From the moment his father had arranged credit for the supplies which would grubstake his two anxiously waiting brothers in California, had dealt with the shipping offices for transportation of the goods, and had had a talk with Captain Joe Creesy about passage for his son, Jabe's waking hours were filled with action.

"I'll see that the young man keeps busy," Josiah Creesy had said through his pointed beard to Ezra Thompkins when the latter put up to him Jabe's plan for working part of his way to the Golden Gate. Around the famous skipper's eyes was a maze of wrinkles that helped make up a salty smile. "And before the run's over, I'll make a

sailor of him. At his age, I was well on my way to command, Mr. Thompkins, so I know how smart youngsters that like salt water are. Send him right along, and we'll get started now."

While the big clipper loaded her cargo on the East River dock, Jabe, dressed in dungarees, picked up a great deal of information not written in books. From the men on deck and pier, he learned the names and use of labor-saving flywheel pumps and gypsy winches and of countless odds and ends of rigging which made up *Flying Cloud's* gear.

He learned the differences between the old British India men who years before had cruised the oceans in leisure and the American packets whose captains put padlocks on their sails so that timid crews could not shorten sail at night while the skipper slept. And he learned just how launched only the year before for the sole purpose of carrying merchandise to San Francisco, were driven around Cape Horn with a skill that ocean navigation never before had witnessed. And of the downright honesty and energy of clipper captains like Josiah Creesy, he picked up much from scraps of sailor talk.

But it was from Tom Johnson, *Flying Cloud's* Negro cook, that he got a good part of his new knowledge. "There y'ree ships ain't nuthin' like all them other boats, none at all. They used to ration us on 'em. But on these here clippers we jest get what we need, and we eat all we kin hold. But," and the old Negro, whose kinky hair was beginning to show signs of white, paused dramatically, "don't you let nobody find you wastin' no watah!"

Every morning, Jabe found, the carpenter measured out of the great cylindrical iron tank abaft the mainmast a gallon of water for each hand. This he put in a scuttle-butt on deck, while careful track of how many gallons remained in the tank was entered in the log by the chief officer. The harness cask, also abaft the mainmast, held the ship's current supply of salt beef and pork, and this was scrubbed with boiling water to make it clean and sweet for every fresh barrel of provisions that was opened.

Instead of the old below-decks forecastle, these new clippers had crew's quarters in a large deckhouse between fore and mainmasts. Bulkheads divided this house fore and aft, and thus each watch boasted separate and comparatively quiet quarters that not only had plenty of ventilation but also had plenty of light.

"And if ever you had to sleep in one of the old type stinkin' holds where even the sooty slush lamp can't hardly get no air to keep going with," old Tom Johnson told Jabe, "you'd know that this yere's real high livin'."

Every day brought added excitement to Jabe. Because every day spent in New York meant that much less time to reach the Golden Gate where fortune for his uncles and his father and himself waited if only he could get to it in time. On May 31, Jabe's father shook his head again.

"We've lost our gamble already, son," he said sadly. "Even if you sailed today, you'd only just make it in time. September 5 is only ninety-seven days away. And here you still are, with sailing date set now for June 3."

Jabe's heart, too, was in his shoes. But he tried to cheer his father with a confidence which he did not feel too

strongly. "Then we'll get to California in ninety-four days, Father. I told Captain Creesy how I had to get there in that time," the youth explained. "And he offered to bet me a share in Uncle Jim's claim that we'd anchor in San Francisco bay before September 5."

On June 3, Captain Creesy dropped the *Flying Cloud* down the East River to anchor off Battery Park for a few hours and take on the crew. The wait for this transfer of men was hard on Jabe, whose anxiety to get started was greater with each passing second. To make the time speed, he watched the crowds on shore — for the sailing day of a clipper was an event to bring a goodly section of the community to fashionable Battery Park — who were waiting for the chanteyman to set the air ringing with his sea songs which were part of getting any big ship under way. And Jabe watched Andy Fay and Tom Daw and Bill Decker as they helped boardinghouse runners get the last straggling sailors and their dunnage into small boats to be rowed out to the waiting clipper.

In one laugh, the nervous Jabe joined heartily. A flannel-shirted, bareheaded sailor who seemed to answer to the name of Bert, had been demonstratively kissed by a Cherry Street sweetheart, and Jabe, along with most of the crowd on shore, heard the girl's high-pitched voice call: "Here's your satchel, Bert."

The girl then had thrown the sailor a bandanna handkerchief knotted about what could not have been more than a comb.

"Bong voy-ahge around the Horn!" she cried. And Bert with a wild grab caught all the worldly goods that would accompany him on that long and dangerous passage.

"In eighteen hundred and forty-six,
I found myself in a terrible fix,
A-working on the railway, the railway, the railway.
Oh, poor Paddy works on the railway."

The chanteyman had started his song. The voyage for California was begun. *Flying Cloud* was bound out of New York harbor — three days behind the ninety-seven-day record schedule that would bring Jabe to his uncle in time to make the family's fortune.

Standing by the rail, his eyes watching the water that swirled along the great ship's sides, the young man was despondent. But out of his sorrowful reverie he was suddenly shaken by the smack of a friendly hand on his back.

"Cheer up, my friend," a deep voice said. "Cheer up! Didn't I tell you we'd pass the Golden Gate in time to make us all rich?"

The youth in blue dungarees nodded and tried to force a smile.

"Well, I meant it," Captain Creesy thundered. "With the help of Heaven and fair winds, we'll do it. And with your help as well, my friend."

The captain's voice was gruffer than Jabe ever had heard it. "Your life of Reilly is finished. Report at once to the bosun and learn how real sailors sail on a real ship."

Captain Joe Creesy was smiling as he turned away from Jabe to the mate. "It'll keep his mind off his troubles to be busy," the skipper said, and chuckled.

Past Sandy Hook, shining in the sunlight, and into the broad Atlantic Ocean *Flying Cloud* drove — and continued to drive. And three days out from New York she

drove out her main and mizzen topgallant masts. Then she lost her main-topsail yard.

As the captain had predicted, Jabe had little chance to think of his race against time. He was too occupied helping the boatswain make ready new spars and rigging. He bustled around — not always in the way, despite the jokes of Bert, the sailor of the bandanna episode — as the crew laboriously set up the new masts next day. And the following day, when a new main-topsail yard was sent up, he finally realized that for forty-eight hours he had been thinking of nothing but the problem of replacing the clipper's damaged gear.

"Ye'll be a sailor," the boatswain, a sturdy Swede, admitted, "by the time we round the Horn."

Jabe laughed. "You mean we'll be rerigging all the way around?"

The boatswain nodded. "Most of the way, anyhow."

For days it seemed as if the boatswain's prophecy were to be correct. And Jabe, in no time, was splicing lines and repairing gear with the ease of a practical able-bodied seaman. When, a week out from port, the mainmast was found to be badly sprung about a foot from the hounds, Jabe had a part in "fishing" the mast.

With each new job that appeared, his confidence in *Flying Cloud's* power and speed increased. For he learned how strongly Donald McKay had built this great clipper. He came to learn how fine a seaman was Captain Creesy, who commanded her. And he discovered from daily contact with the motley crew what marvels of seamanship these sailors could accomplish when called upon to keep the vessel driving with all her might.

Mornings he loved, looking out over a rolling expanse

of sea as he drank a tin pot of molasses-sweetened coffee under the lee of the weather bulwark. Turning to with the crew to wash down decks or helping the boatswain rig the head pump, he worked with breezes purring softly through the lofty rigging. And when these breezes freshened, he was among the first to respond to the officer's orders to sway up and make taut the halyards and braces and sheets that held the bellying white sails.

Down past the equator *Flying Cloud* sped, and Jabe's pessimism gave way to the hope that originally had filled him.

"We're making knots," Captain Creesy confided one morning after he had taken his sights and the log had been hove. "We've been averaging 9½ knots for a week."

"Then we will make California in time?" said Jabe, his voice showing that his hope was framed as a question and not as a statement of fact.

Captain Joe Creesy waved his hand enigmatically. "I said we would."

But next day, July 11, as the clipper scudded under double-reefed topsails through South Atlantic seas that threw spray over *Flying Cloud's* deck and drenched everything in their path, the skipper's assurances meant nothing to Jabe. Because in the thunder and lightning that broke from skies that were darkened like the late twilight of a summer evening, the clipper's fore and main-topmast staysails split. And shortly after noon, when the captain learned that the mainmast also had been sprung, he sent down royal and topgallant yards and the studding sail booms off lower and topsail yards to relieve the strain. Then, two days later, *Flying Cloud* carried away her main-topsail-tye and the band around her mainmast.

Still the gallant ship drove on toward the Horn, while everyone aboard, including men released from the brig, worked frantically to repair the damage and to set all sail once more. No one worked harder than Jabe. Every moment, it seemed to him, counted now. And when, on July 23, *Flying Cloud* passed Cape Horn, five miles south of the snow-covered coast, Jabe's heart lifted again. For, even he could see, as the corner was turned, that rounding the Cape in fifty days augured well for a fast run, once the speedy clipper headed north and got full advantage of the Pacific's southerly winds behind her.

Jabe's heart rose even higher during the following week, for when *Flying Cloud* finally did point north she headed for the Golden Gate, with fine weather and with the finest of southeast breezes. All sail set, she fairly skimmed over the water.

Then squalls set in, and once more his heart sank. Lower and topgallant studding sails were taken off. High seas began to run. Water swept over the ship. So his amazement was great when Captain Creesy announced the run of July 23.

"Just 374 miles by observation!" the skipper shouted, showing a pride unusual for him. "Fifteen and a half knots average. And during some of those squalls we did better than 18!"

What Jabe heard on deck that day gave him a real appreciation of *Flying Cloud's* fast heels. For 374 miles in twenty-four hours was the greatest mileage that ever had been piled up on any ocean.

"They'll never beat that nohow!" declared Tom Johnson, his black face wreathed in smiles as he filled the mess kit for the crew.

"What does an old-pot-walloper like you know about it?" demanded Bert.

"Ah only knows nobody ain't never goin' sail no faster," grinned the cook.

The Swede boatswain confirmed him. "You bane dommed right," he declared.

For twenty-six consecutive days *Flying Cloud* raced north as if carried by Jabe's prayers for speed, and for twenty-six days the youth's heart raced with her. Nearly six thousand miles she ran off with the precision of clock-work, and for four days in a row the gallant clipper scudded over the Pacific's swells at $13\frac{1}{4}$ knots. Three hundred and fourteen miles she averaged from noon to noon on each of those four days.

Jabe could hardly contain himself.

"We'll reach the Gate in less than ninety-four days!" he said exuberantly to Captain Creesy as an August sun began to set in the far west of the broad Pacific Ocean and the beautiful clipper, under the mighty spread of all her tremendous canvas, slipped like a greyhound of the sea through smooth waters. "Do you think . . . do you think we'll get in in time?" he finished, suddenly unsure again.

The captain, running a salt-stained hand through his pointed beard, laughed. "Didn't I say we would, before we started from home?" he replied laconically with the Down East Yankee's typical question in answer to a question.

Such smooth sailing was not to last forever. On August 29, eighty-seven days out, *Flying Cloud* lost her fore-topgallant mast. Weather was squally and the wind was strong. Jabe Thompkin's heart again sank to its lowest

point. But there was nothing for him to do except plunge into the strenuous task of setting a new spar. He threw himself heart and soul into the job. He must get the ship to San Francisco, and every second counted, he told himself.

As Jabe related the story of the setting of that spar to his father later:

"I really didn't know much what I was doing. I could only keep thinking all that day and part of the next about how the broken mast was delaying us and how you and Uncle Jim and Uncle Jack and I would lose everything if we didn't get to port on the 5th. I hardly knew the date. All I did seem to know was that I'd give the shirt off my back to get that spar in place. And then, it seemed to be from miles below, I suddenly heard Captain Joe's voice ordering me down from the rigging."

As Captain Creesy used to tell the story for many years afterwards:

"There I was, with my back turned for only half a minute, and what did I find but Jabe sixty feet and more above decks like a regular salty seaman. The same youngster, mind you, that hadn't been on a big ship before we left home. 'Thompkins, come down out of there!' I yelled. And what do you think he answered back, the crazy young landlubber?"

Captain Creesy always pulled on his beard at this point in the story.

"Well, he yelled back as calm as could be that he was busy as thunder getting the ship fixed so's she'd make the Gate by the 5th! Said he wouldn't have nerve enough even to look down until the job was done, much less climb down."

Captain Creesy always finished his tale the same way, too.

"So I just said nothing. And then I thought he'd jump off the ship without his pants when I routed him out next morning and showed him South Farallones bearing north-east $\frac{1}{2}$ east."

"That means we'll drop anchor in San Francisco harbor before noon," Captain Creesy had told the excited youth that morning.

"Then — then we have made it in time!" Jabe shouted.

"In time!" The captain was yelling back at him. "In time! Why, son, today's only August 31. We've made the passage in eighty-nine days — eight whole days less than the record! And it'll be many a long month before you bring any more goods around the Horn any faster. You can lay to that, and tell 'em all at the Astor House that I said so."

Captain Josiah Creesy was tight. *Flying Cloud's* record has never been beaten.

* * *

And so, in the nineteenth century, did America's clipper ships carry the goods on Atlantic and Pacific Oceans.

WITH PONY EXPRESS MAILMEN

THE PONY EXPRESS RIDER

by Joseph Walker

IT'S a pity you're not a few years older, Billy. I would give you a job as Pony Express Rider. There's good pay in it."

Thus spoke George Chrisman, a Western agent for a company that was on the point of launching a venture which many people called ridiculous, but which nevertheless appealed to the imagination of everybody between the Mississippi River and the Coast. It was nothing more nor less than to maintain a chain of fast riders reaching clear to California, nearly two thousand miles, for the regular carrying of the mail.

Though Chrisman spoke jestingly, the boy at his side looked up quickly.

"Oh, I say, Mr. Chrisman, give me a chance at it! I can ride as well as any man — you know I can!"

"Sure you can ride," replied his friend, good-naturedly; "but, boy, it takes more than riding — it takes sand!"

Before them on a table lay a St. Louis paper containing the notice which had set the whole West buzzing, and Chrisman picked it up for the boy, William Cody, to read for himself. This is what he read:

"To San Francisco in 8 days by the Central Overland California and Pike's Peak Express Company. The first courier of the Pony Express will leave the Missouri River on Tuesday,

April 3rd, at 5 o'clock P.M., and will run regularly weekly thereafter, carrying a letter mail only. The point of departure on the Missouri River will be in telegraphic communication with the East, and will be announced in due time."

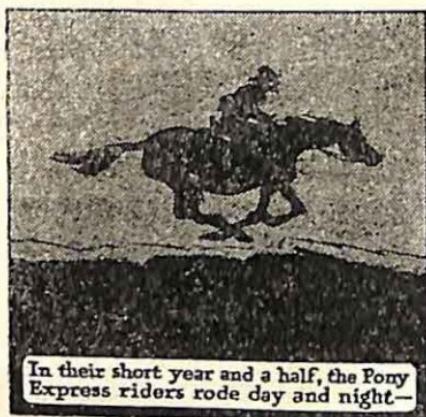
"Aw, shucks, Mr. Chrisman, give me a chance at it, won't you?" pleaded the boy, his eyes shining. "Where is it to start from?"

"From St. Joe. Want to go over and watch 'em get away?"

"Sure I do. But I want more than that: I want to carry that mail myself!"

"Well, we'll think about it," said Chrisman laughingly. To understand the setting of this story, we must remember that California, up to the year 1860, was as remote from the rest of the United States as Madagascar. The usual route for mails was by water, either around Cape Horn, requiring weeks, or carried across the Isthmus of Panama from one ship to another and thence up the coast, a journey nearly as tedious. Between the Mississippi River on the east and the Pacific on the west lay hundreds of miles of trackless wilderness, barren desert, and frowning mountain. No railroad had yet pierced it, and the telegraph had yet to stretch its wires across. A war might break out in the East — as, in fact, actually threatened at the time this story opens and soon became reality — and the Californians would be blithely ignorant of it for weeks.

A quicker and steadier means of communication was a necessity. Thus thought three men whose names became famous in the Old West for their freighting and express business carried on by coach and horsemen. Their names were Russell, Majors, and Waddell, and with fine imagination they began quietly to lay plans for this fleet of fast



In their short year and a half, the Pony Express riders rode day and night—



—rain or shine, winter or summer, running the gauntlet of Indians, floods,

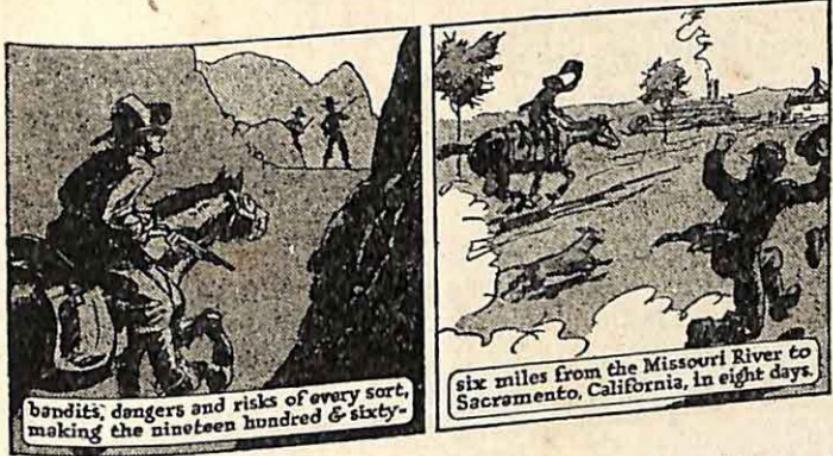
riders, called the Pony Express. So quietly did they work that they had all their plans made and most of their equipment ready before putting the notice in the St. Louis Dispatch, announcing the opening date.

"Say — you'll have to have a whale of a bunch of horses and riders for that outfit!" said young Cody.

"You're right. That's one of my jobs out here — getting good horses for 'em. No horse is too good for the service. Why, we are paying as high as two hundred dollars apiece for 'em. And riders will draw down fifty to a hundred and fifty dollars a month — but they must be the best little old riders in the world and afraid of nothing!"

"How many will you need?" persisted the boy, his voice vibrating with eagerness.

"Well, we're planning to put on eighty riders to start, and 420 horses, for we are putting in relay stations about fifteen miles apart clear across the Plains. There'll be no monkey business about this. Our boys will ride at top speed all the time — just like Indians were after 'em — as may be the case, like as not!"



Chrisman then proceeded to paint the difficulties and dangers of this route, which were evident enough, for the West of those days was a very Wild West indeed. But the more he talked, the more eager became his listener to try Express riding for himself. Finally the older man compromised.

"You're a bit under age, Will," he said; "but I'll tell you what I'll do. I'll take you on as a substitute for a rider named Trotter out here on my division. He has only a short run — forty-five miles — and a change of three horses for it. That ought to be a cinch for you. You were born on horseback, I reckon!"

"That's great, Mr. Chrisman!" said the boy, who was, indeed, already famous for his feats of horsemanship.

The opening day at St. Joseph, Missouri, was a gala occasion. A great crowd had assembled in the streets, and the excitement was at fever heat. Flags were flying everywhere, and a brass band added to the hubbub. A short-line railroad, the Hannibal and St. Joseph, had arranged to run an excursion as well as bring in the mail from the East. It was due in the afternoon, and at last the waiting

throng heard a faint whistle down the track. "Here she comes!" they shouted, and up puffed the train, on time.

Scarcely had it stopped, when busy hands were transferring the mail pouches to a wagon, which rattled down the streets to the post office. A few minutes more and the Pacific mail was sorted out and ready for the Express rider. His name was Johnnie Frey, and he was a wiry little fellow, scarcely twenty years old, and weighing only 125 pounds.

Mr. Russell himself, one of the three members of the firm, adjusted the letter pouch on the saddle. It was limited to twenty pounds and contained, besides letters and a New York newspaper printed on tissue paper, a message of congratulation from President Buchanan to Governor Downey, of California. As the last buckle was adjusted, Johnnie sprang into the saddle; a few of the nearest of the excited crowd pulled hairs from his horse's tail for souvenirs, then the throng scattered to make way for him, and down the main street of St. Joe he went at a mad gallop, the people shouting themselves hoarse.

At the foot of the street at the Missouri River landing, a ferryboat was waiting for him, and on it he dashed. Hardly had his steed's hoofs struck the planking, when the bells clanged and the craft pushed off into midstream. The first trip of the Pony Express was begun.

On the Kansas side of the river the swift scene was re-enacted. As the ferry touched the wharf and before it was made fast, Johnnie spurred his impatient horse forward, the margin of water was cleared at a bound, and horse and rider disappeared in a cloud of dust out toward the western sun. Strangers gripped each other's hands at the sight, clapped one another on the back, shouted

themselves hoarse — and in more than one man's eyes tears could be seen. Yes, it meant a lot to the West!

What lay ahead? At the end of Johnnie's run, another man and yet another would spring into saddle and ride night and day to deliver that precious parcel at its destination, two thousand miles away. The route lay through Northeastern Kansas and into Nebraska, up the valley of the Platte River, across the great plateau into the foothills and over the summit of the Rockies, into the arid Great Basin, over the Wasatch Range, into the valley of Great Salt Lake, through the terrible alkali deserts of Nevada and the parched sink of Carson River, over the lofty Sierras with their snow-encumbered passes, and finally into the valley of the Sacramento, where a waiting steamer would take the mail for the last lap of its journey to San Francisco.

What a prospect! To the terrors of an untraveled country were added prowling savages, wild beasts, winds, rains, blizzards, intense cold, parching heat, the blazing sun of noonday, the intense darkness of midnight — but through it all the riders must press forward night and day — the mail pouch must go through!

The wildest and most unexplored parts of America lay ahead. Along the entire route there were only four military posts, two or three hundred miles apart. The small relay stations established by the Company were the only human habitations for other hundreds of miles. Exposed as they were to the attacks of Indians, they were liable to be wiped out, and more than one station suffered this dire fate, as the tired Express riders found to their own distress after completing a toilsome run. There was no relief horse or rider waiting.

But despite these almost insurmountable difficulties, the Pony Express was established and maintained. The same day on which Johnnie Frey rode out of St. Joe, another rider, Harry Roff, started on the eastern trip from Sacramento. Each rider covered from 75 to 125 miles, depending upon the nature of the country, and changing horses every ten, fifteen, or twenty miles. The horse tender at the lonely relay station would see him coming, a mile or two away, and would have his fresh mount saddled, bridled, and waiting. Up would come the rider at full gallop, pull his tired beast short up on its haunches, leap to the ground, transfer and buckle on his saddlebags, and go on his way, often hardly stopping to take a gulp of water. Two minutes was the time allowance for a stop, but half that time often sufficed. The men made a speed of about eighteen miles an hour. Harry Roff on his first eastbound trip covered the first twenty miles in fifty-nine minutes.

Meanwhile the succession of riders who relieved Johnnie Frey on his westward trip kept up the same good speed that he had set for them. The original mailbag with the President's message was delivered in Sacramento in nine days and twenty-three hours. The same great scenes of wild excitement marked the end of this famous run, as they did its beginning. Bells were rung, whistles were blown, men shouted, and business was at a standstill. When the panting horse and rider dashed into the streets of Sacramento, they were almost mobbed. Stopping only a few moments to toss off the local mail, the rider hurried aboard a waiting steamer for the last lap of the journey down the river to San Francisco. That city was reached in the dead of night; but as soon as the whistle of the steamer

heralded its approach, the city came awake as by magic. People hastily dressed came running down to the wharf. Whistles screeched their welcome, and a fire engine dashed madly out to escort the Express rider to the post office.

But during all this fever heat of the inauguration of the service, what of the boy, William Cody? Within a few days, to his great joy, his friend sent word for him to present himself for riding. He was to be put on the forty-five-mile run that Chrisman had mentioned. After he had filled out the application blank and answered questions as to his parents and habits, he was required to swear to an oath which was required of every rider entering the Express service. This was the oath repeated by Cody with uplifted hand:

"I, William F. Cody, do hereby swear, before the Great and Living God, that during my engagement, and while I am an employee of Russell, Majors, and Waddell, I will, under no circumstances, use profane language; that I will drink no intoxicating liquors; that I will not quarrel or fight with any other employee of the firm, and that in every respect I will conduct myself honestly, be faithful to my duties, and so direct all my acts as to win the confidence of my employers. So help me God!"

This oath told eloquently of the high character of the riders employed, as well as of the Company employing them. It could well be tacked up on the lintel of every office today. Within a few weeks after its establishment, in fact, the Pony Express had won the confidence of the entire nation, and later it performed inestimable service at the outbreak of the War between the States.

Cody, like the other riders, wore no special uniform. The men dressed to suit their tastes. But their usual garb was a buckskin hunting shirt, cloth trousers, high boots, and a slouch hat. Often a large handkerchief protected their necks from the sun or flies. As for weapons, they carried a sheath knife and a pair of Colt pistols. At first they slung a carbine around their shoulders, but soon discarded this. Nearly all the riders were quite young, few exceeding twenty-five, and were light of frame and wiry.

The saddlebag used by the rider for carrying the mail was called a mochila. It had openings in the center to allow it to fit snugly over the horn and tree of the saddle and yet be removable without delay. The mochila had four pockets called cantinas, one in each of its corners — so that there were two in front and two behind the rider's legs. In these cantinas the mail was carried under lock and key. Three had keys which permitted them to be opened at the military posts along the way, while the fourth was reserved for local or way mail stations. In this cantina was a timecard for noting time of arrival and departure of the rider.

The letters were wrapped in oiled silk to protect them from moisture, either from rain, or from water in fording streams, or perspiration of the horse. While the weight of the mail was limited to twenty pounds, it rarely exceeded fifteen. The postal charges at first were five dollars for each letter weighing half an ounce, which seems cheap enough when the trip is considered, but as the service got better established, the Post Office Department reduced this charge to one dollar for each half ounce. As a result, persons writing letters to their friends in San Francisco usu-

ally used a very thin tissue paper. A few newspapers were so printed, but were not sent regularly.

As for William Cody, he entered into his new duties with a light heart. His first run was not dangerous nor long. Accustomed as he was to the saddle all his life, he treated his forty-five-mile dash, using three horses, as a great lark. He had no difficulty in riding on schedule, often cutting down the time. But he was only a substitute and after a few weeks the regular man, Trotter, returned and Will was out of a job.

Riding east as far as Fort Leavenworth, he obtained a letter of recommendation from Mr. Russell, the head of the firm, and presented this to Jack Slade, the superintendent of another route. Slade — a noted and notorious character of the frontier — was just then hunting for an experienced rider to cover one of the hardest of his routes, and glanced askance at the youthful applicant. But when he read Russell's letter and learned that Cody had ridden another route satisfactorily, he decided to give him the job, despite his youth. The new route was seventy-six miles long, running from Red Buttes to Three Crossings — a place on the Sweetwater River so called because the stream, as it followed the bed of a canyon, had to be crossed three times in a distance of sixty yards. The water, being a mountain stream, was icy cold, and there were pitfalls and deep pools lurking for the unwary.

Another fording hardly less hazardous was across the North Platte, which had dangerous quicksands, the river being half a mile wide at the ford, and twelve feet deep in places. And as if this were not enough, his route lay through hostile Indian country, and was also infested by desperadoes.

Despite these dangers, young Cody rode his route successfully for two or three weeks. He was almost on the point of thinking that it would prove as monotonous as his former one, when a series of adventures brought him up sharply. One day after riding in his usual mad galloping way, he reached the end of his journey, Three Crossings, well within the allotted time. What was his horror to find that the relief rider, who was to have taken the mail further, had been murdered, either by redskins or by bandits. It was clearly up to him, tired as he was, to carry on. Fortunately there were fresh horses, and within a few moments he had remounted and started out on a new and strange route which led him to Rocky Ridge, eighty-five miles away. Buoyed up by the perils of his trip he continued on to this terminal and then started back with the eastbound mail, ending by going again over his own division and into Red Buttes. When the tired youth almost fell off his last mount, they found that he had covered the amazing distance of 322 miles—but he had carried the mail!

On more than one occasion Cody sighted redskins, but the speed of his mount carried him out of danger. It is said that the Indians frequently stared openmouthed at the mad riding of these reckless horsemen. Nothing like it had been seen in their tribes. But one day a band of Sioux decided they would like to add that fast pony to their string, to say nothing of an extra scalp for some warrior's belt. But young Cody had different ideas; he needed both himself. As the Sioux swooped down upon him, firing as they came, he lay flat upon his pony's back and urged the faithful little animal to still better speed. For agonizing minutes the race with death held on, the

bullets and arrows whizzing all about him but luckily missing. Then the training and endurance of his mount told. He slowly drew away from the red pursuers and thundered into Sweetwater, his next stop, minutes ahead of time. However, not yet was he out of danger. The Indians had been there ahead of him, killed the keeper, and driven off all the reserve stock. There was nothing for him to do but to continue on with his tired horse for twelve miles more, where the relay station was fortunately intact.

On another occasion he was entrusted with a large sum of money in currency, and had reason to believe that bandits knew of its passage. These "road agents," as they were called, did not hesitate at murder as well as robbery, and Cody felt he must outwit them. He obtained an extra mochila which he stuffed with papers and placed in the regular position on the horn of his saddle. The other one with the bills was then hidden under his saddle. He had not ridden many miles when, in a lonely spot, his fears were confirmed by seeing two masked men who stood directly in his path with loaded pistols.

"Halt, young fellow!" they challenged sharply. And as he perforce reined in, they continued, "Throw up your hands!"

Slowly young Cody's hands went up, while he never took his eyes off his assailants.

"We don't want to hurt you, young fellow," one of them continued, "but we do want that package of letters powerful bad."

"Don't you know they will hang you for fooling with the United States Mail?" Cody asked, to gain time.

"They'll have to catch us first. Now you unfasten that

sack and be quick about it. If you start any monkey business we'll drill you full of holes."

Will reached around for the dummy sack, which he made a great pretense of having trouble in unfastening. Suddenly he straightened up. "Here it is!" he shouted, and hurled it directly into the face of one of the road agents. The fellow was bowled over by the blow. Quick as a flash the young Express rider dug his spurs into the side of his horse and headed full at the other man. He dodged, but got a vicious kick from one of the animal's hoofs. Away galloped Cody, not looking back. He reasoned that the surprise the bandits had gotten would prevent them from shooting, and besides they had the mail sack they thought they wanted. He rode on unmolested to the next station and delivered his package of money safely. But he said afterward that he would have given a good deal to see the look on the faces of the highwaymen when they opened their sack and found nothing but waste paper.

Many were the thrills and adventures of Cody's associates also on these long, lonely rides across the Plains. In a few instances they ended tragically for some brave young fellow, who never came back, and whose bones were left to whiten alongside the trail. As for Cody, when he left the service unharmed, it was to engage in other forms of scouting quite as exciting. He has come down to fame as one of the greatest of our scouts—"Buffalo Bill."

But the supreme or "acid" test of the Pony Express service came with the election of Abraham Lincoln to the Presidency. It was a hair-trigger time when the North and South were squaring off at each other and threaten-

ing to fight. When Lincoln was elected in November, 1860, it was highly important that the news should be sent to the Coast as speedily as possible, in order to hold this faraway part of the country safe for the Union.

Away from St. Joseph dashed the first rider, amid excitement rivaling that day when the first letter had started west. At every relay station extraordinary plans had been made to make their usual good time even better. Picked horses were led out, at some points, two or three miles in advance of the station to furnish an extra relay and added speed. On and on the reckless fellows dashed, scarcely slackening speed even when riding in the dark — truly a test for any horseman's nerve! Relay after relay was clicked off in record-breaking time. The last rider dashed into Sacramento and was whisked on a waiting boat and thus taken to San Francisco, followed by yells of "Lincoln is elected! Lincoln is elected!" The total journey of exactly 1966 miles had been made in eight days.

It would seem as if human endurance had reached its limit — but the Pony Express was not through with records yet. In March of the next year, Lincoln made his first inaugural address, while the East was throbbing on the verge of war. What would the West think and do? It was of supreme importance that the Government should find out.

The Message was sent by the fastest trains to St. Joe, and again the gallant riders were told to better their best.

"Take this Message to the Coast faster than any word has ever yet gone through!" ordered Mr. Russell.

The boys, one after another along the line, repeated the words with grim earnestness. And they did. How they rode! "Pony Bob" Haslam, one of the best men that ever

pressed stirrup leather, galloped at breakneck speed for 120 miles, pausing only to change mounts every ten miles, and covered his route in eight hours and ten minutes—or at the rate of nearly fifteen miles an hour. Another man rode ten miles in thirty minutes. The total journey from St. Joseph to Sacramento required just seven days and seventeen hours!

The Pony Express did not die of old age; it passed away in its prime. The fall of that same year, 1861, saw the first telegraph poles pushing their way across the Plains, and before the end of the year a line had been opened through the Sierras. The click of the telegraph instrument was much more prosaic than the clatter of pony's hoofs, but it did in minutes what had required the brave horse and rider days and days to perform. So within a year and a half after its beginning, the Pony Express was no more.

In that brief time, however, what a valiant service it had performed, and what romance had gathered about its deeds! It is part and parcel with the Old West. Mark Twain, who knew the frontier in his boyhood, says in one of his early books:¹

"The pony rider was usually a little bit of a man, brimful of spirit and endurance. No matter what time of the day or night his watch came on, and no matter whether it was winter or summer, raining, snowing, hailing, or sleetting, or whether his 'beat' was a level, straight road, or a crazy trail over mountain crags and precipices, or whether it led through peaceful regions, or regions that swarmed with hostile Indians, he must always be ready to leap into the saddle and be off like the wind. There was no idling time for a pony rider on duty. He rode fifty miles without stopping, by daylight, moonlight, starlight,

¹ "Roughing It."

or through the blackness of darkness just as it happened. He rode a splendid horse that was born for a racer and fed and lodged like a gentleman; kept him at his utmost speed for ten miles and then, as he came crashing up to the station where stood two men holding fast a fresh, impatient steed, the transfer of rider and mail was made in the twinkling of an eye, and away flew the eager pair and were out of sight before the spectator could get a ghost of a look.

"We had had a consuming desire to see a pony rider (continues Mark Twain, who was riding in an Overland Stage) but somehow or other all that passed us and all that met us managed to streak by in the night, and so we heard only a whiz and a hail, and the swift phantom of the desert was gone before we could get our heads out of the windows. But now we were expecting one along every moment and would see him in broad daylight. Presently the driver exclaims: 'Here he comes!' Every neck is stretched further and every eye is strained wider.

"Away across the endless dead level of the prairie a black speck appears against the sky, and it is plain that it moves. Well, I should think so! In a second or two it becomes a rider, rising and falling—sweeping toward us nearer and nearer—growing more and more distinct, more and more sharply defined—nearer and still nearer, and the flutter of the hoofs comes faintly to the ear—another instant a whoop and a hurrah from our upper deck, a wave of the rider's hand, but no reply, and man and beast burst past our excited faces and go winging away like a belated fragment of a storm.

"So sudden is it all, and so like a flash of unreal fancy, that but for a flake of white foam left quivering and perishing on a mail sack after the vision had flashed by and disappeared, we might have doubted whether we had seen any actual horse and man at all, maybe."

INTRODUCTIONS AND QUESTIONS

THE SPIRIT OF THE NIGHT AIR MAIL

What is the spirit of the night air mail? That is the question the newspaperman put to Old Pop Connors back at the landing base. And Pop Connors was only too ready to answer it. For hadn't he been among the mail-bearing eagles who started the flying game? And hadn't he watched new and younger pilots gradually take the place of the old-timers until the old spirit, too, was gone? It was a sad and a little embittered Old Pop Connors who thought he knew the spirit of the night air mail as it is today.

After you read the story you will see how the grit of a young air-mail pilot proved what Pop Connors did not know — that the spirit of the night air fliers still lives on. It cannot die. Try to define that spirit for yourself as you read.

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1. What must the successful aviator possess which scientists can never supply for him?
2. In the history of man's struggle with natural forces which has been the more important:
 - a. the weapons used in fighting nature, or
 - b. the spirit of the fighter?
3. Old Pop said, "The old spirit of the night air mail is no more; dead, killed by science." How would you answer him?
4. If you need more information to convince Old Pop, you should read "West-Bound Mail."

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" CHICAGO CALLING "

Careful preparation is the key to successful adventure. Yet it is the adventure itself that attracts the most attention. No one, for example, ever speaks about the planning that Lindy did before he nosed his ship eastward across the Atlantic. But for weeks he had been making the most careful preparations. He had practised staying up more than twenty-four hours at a time. He had studied maps and weather reports. He had checked every nut, bolt, and screw on his ship. All of these preparations were necessary to the success of his flight.

Before Richard Byrd left on the *City of New York* for the Antarctic, he too had made careful plans. He had figured out how many men would be necessary to his undertaking. He had estimated how much food they would need, and what food would be most nourishing and at the same time the easiest to carry. He had found a doctor to go with him to be on hand should sickness or accident occur. Experienced sailors and dogteam drivers had been found. His planes had been especially equipped to fly in below-zero temperatures. All of these preparations were necessary to insure success for the great adventure to the Antarctic.

You see adventure isn't all fun for the adventurer. A large part of it is work — the kind of detailed work that is involved in careful, intelligent planning for whatever may come. In the selection you are to read next you will be introduced to some of the planning and careful study that lie behind the greatest of modern adventures — the passenger air service.



1. New inventions often call for trained men to do new types of work. Name some new jobs for men and women which began with the commercial use of airplanes for transportation.
2. Science has changed aviation by placing emphasis upon careful preparation. After reading this story, read the thrilling story of the first American airplane flight ("Two Americans Take Off!" page 113) and prepare yourself to discuss

the development of scientific methods in the building of up-to-date airplanes.

3. Name three conditions which would cause an aviator to use an emergency landing field.
4. Make a list of the different devices prepared by scientists to insure the pilot and his passengers of a "happy landing."
5. Why would the following phrases make a good slogan for commercial air transportation companies—"Greater Safety," "More Convenience," "Higher Efficiency"?

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WEST-BOUND MAIL

If ever you have an opportunity to see the new post office in New York City you will be attracted by the following inscription carved in stone across the front of the building:

"Neither snow nor rain nor heat nor gloom of night stays these couriers from the swift completion of their appointed rounds."

These words were written more than 2500 years ago by the Greek historian, Herodotus, in praise of the messenger service of the king of Persia. Though himself an enemy of the Persians, he was forced to marvel at the excellence with which the king's post riders carried his messages to the four corners of his empire.

Now after twenty-five centuries we can find no more fitting words to describe our modern couriers—the fliers of the United States air mail. Every hour of the day and night these messengers of ours are roaring through the sky carrying the mail from one end of the country to the other.

Like the couriers of old they do not stop for rain or snow. Neither heat nor gloom of night can keep them from completing their appointed rounds. Sometimes a flier meets with misadventure—a forced landing, a crippled plane—and his flight is ended before the goal is reached. But another pilot and another ship carry on. Mail bags are hastily shifted and the appointed round is completed.

This story pictures the faithfulness and courage of the men who carry the air mail.

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1. How much do you know about flying a ship? Do you know what ailerons are? Do you know how to bank a ship? Do you know what a sideslip is? Do you know how a parachute jump is made?
2. What dangers faced Don in landing his ship on the concrete? In getting it off again?
3. What evidence can you find to prove that Arngren's first thought was for the safety of the mail?
4. Recall an experience of your own when you discovered that like Arngren you had boasted too soon.
5. Why was Bill Mann's parachute jump so dangerous?
6. If you have ever visited a flying field, try to recall points of interest to tell the class.

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LINDBERGH'S PARACHUTE JUMPS

What is your attitude toward another person's success? Suppose a classmate wins a hundred-yard dash, or is chosen class president, or writes a prize essay. Are you willing to admit his superiority? Or are you the kind of person who sighs for some of the other fellow's "luck"?

If you find yourself a believer in luck try to analyze the term to see what it means. Take for example the expression "Lindy's Luck." You have often heard it ascribed to Colonel Charles A. Lindbergh. His career is crowded, as you know, with "high-spots": his first flying for the air-mail service in 1926, piloting "The Spirit of St. Louis" on a non-stop flight from New York to Paris and receiving a \$25,000 prize in 1927, winning the Woodrow Wilson Medal and another \$25,000 for his Good-Will tour in 1929.

In all these daring adventures Lindy took long chances and had more than one narrow escape. But escape he always did. Was it just his luck? Probably it was, if by "luck" you mean thorough understanding of airplanes, flying skill, poise, cool head, clear thinking, fearlessness, and a good many other qualities that belong to Lindbergh's flying career. As you read the following story, you will have no trouble in discovering how all these qualities together make up what is called "Lindy's Luck."

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1. Have you ever stood on the top of a very high building and looked down at the people in the street? How did you feel? If you can understand this feeling, then you can appreciate the strange feeling that came over Lindy as he prepared to bail out of his plane.
2. What do you think was his greatest worry as he prepared to jump?
3. Have you ever read of parachute jumpers being caught by a falling plane?
4. What makes the plane travel in a circle as it falls?
5. How did these experiences, in which courage and quick-thinking were so important, help Lindy in his flight across the ocean?

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"THIS IS STATION R-A-D-I-O"

When President Franklin D. Roosevelt was inaugurated on March 4, 1932, a description of the entire ceremony was broadcast to the most remote farmhouse and hamlet in the United States. When Amelia Earhart landed in California after her amazing flight across the Pacific Ocean, she spoke words of greeting to the whole country via radio. When Seth Parker, the famous radio character, was tossed about in his small ship in a hurricane on the Pacific Ocean, he broadcast to the American radio audience an account of what was happening. In the Spring of 1934 a huge and

costly fire swept the South Side of Chicago. An eyewitness account of the disaster was broadcast from the very scene of the fire itself. The Ethiopian Emperor, Haile Selassie, and Premier Mussolini, speaking from their respective countries, told American radio listeners their own sides of their argument. A play-by-play description of a World's Series baseball game, college football games, tennis matches and track meets today can be heard all over the United States — all over the world.

But in 1924, this sort of eyewitness broadcast was impossible. Broadcasting was limited to what took place within the four walls of a small broadcasting studio. Since that time, radio engineers have patiently spent countless hours of research and experimentation to develop radio to the art and science it has now become.

In the article you will read next, Graham McNamee, one of radio's most famous personalities, tells of the early days of radio and what goes on behind the scenes in a broadcast.



1. Have you ever attended a one-ring circus and later a three-ring gigantic show? Can you tell what made the difference in the atmosphere of the shows? Read Graham McNamee's description of W-E-A-F as a one ring broadcasting station and later as the largest producing studio on the air lines, and be able to compare the two as to:
 - a. kind of program broadcasted
 - b. size of audience reached
 - c. control of echoes inside the studio
 - d. announcements
 - e. methods of soundproofing
 - f. "inside" and "outside" and "inside"
2. Why is it important that the engineer keep in touch with the studio?
3. In what ways is a microphone like a telephone transmitter? How is it different?
4. What changes can you see in radio sets within your memory of them?

RIDING THE NIGHT RADIO POLICE PATROL

Don't you like to curl up in a comfortable chair before the radio after your home work is done and enjoy your favorite program before bedtime? And doesn't everything seem peaceful and quiet? The music begins. Those voices! How they thrill you! You determine to practice more, starting next week. Then, perhaps, some day your voice will come in over the evening air, and. . . . Oh, such static. Another police call. What a nuisance! Just in the middle of the chorus, and you had the words almost memorized. There it goes again: "Calling all cars. A robbery on Main Street. Squad Car 65 investigate."

Soon the music will resume its tempo, and the police call be forgotten. But aren't you a little curious to find out whether they got their man? Wouldn't you like to hop into Cruiser Car Sixty-five and experience a few of the thrills that are a part of any night's work in the lives of the men who ride the radio police patrol? Here is your chance. Read the following story and get the feel of running down a criminal. Your nerves will tingle with excitement as you hear the screaming siren of the car dashing madly along, its speedometer climbing higher and higher. You will get a few sidelights, too, on this department of the police system of our large cities, and learn much about police tactics you may not have known before.

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1. Why are police radio cars necessary in large cities like New York and Chicago?
2. Where does the police broadcasting station get the information which is broadcast to the cruisers in the patrol districts?
3. Why is it very necessary that people who report suspicious characters and the news of criminal acts, should be very careful about their information?
4. Can you tell why the policeman in charge of Patrol 65 said that this article describes "a pretty tame night"?

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HUNTING ELEPHANTS FOR MUSEUMS

If you have ever visited the American Museum of Natural History in New York or the Field Museum of Natural History in Chicago, you probably have met a powerful elephant here and there. Not a live elephant, of course, though he looks real enough in his jungle setting. In fact, in your imagination you seem to hear the trumpeting call of his wild brothers far off in a bamboo thicket.

But everything is quiet in his museum home. There is not a rustle in the grass. The king of the jungle stands motionless, a figure of dignity. But you know he has had his share of adventure. He has roamed with the herd night after night through jungles, across rivers, and over mountains. He has known what it is to fight, too, for big as he is, the elephant is sometimes forced to prove his strength.

Now his days of triumph are over. His last battle has ended and left him the loser. But it was no mean struggle — his submitting to man's superior mind — as you will see from the following story. It was the kind of breath-taking combat that fills the pages of history of big-game hunting. And no one can write such a history more vividly than Mr. Akeley has done in his *Adventures in the African Jungle* from which this story was taken. If you read the whole book you will find other animals retaining their personalities and becoming something more than mere museum specimens.



What would you do —

If you were hunting elephants in Uganda and were badly injured by a charging bull elephant?

Every town or village in the United States has a doctor who is within calling distance in case a person is injured and needs treatment for his injuries. The presence of doctors often makes us less independent than we should be. Every person should know the simple principles of first aid.

1. When Carl Akeley was charged by a wild, bellowing ele-

phant, he was seriously injured. He lived to write about his experience because he knew how to give his porters instructions to treat his injuries. He knew a physician would arrive with the main party, but he did not know how long the party would be in overtaking him. What would you have done?

2. Carl Akeley regained consciousness hours after the elephant charged him. He gave his boys orders to make him comfortable and guard him against infection. What would you have done had you been one of his boys when you found your employer unconscious from pain and badly injured? What is the first thing to do to make a person regain consciousness?
3. Carl Akeley had among other injuries a few broken ribs and a punctured lung. What would you have done to make him comfortable?
4. Carl was bleeding from his wounds and was in danger of inflammation setting in his wounds. What would you have done to stop the bleeding and protect the open wounds?
5. Carl gave orders to his boys to search for the main party. The boys could not leave him exposed to the dangers of wild animals and the cold weather. How would you have signalled to the main party?
6. Carl had fever and wanted lots of water. How would you have protected him against infection from impure water?

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EXPLORING ON THE ISLAND OF BORNEO

Slipping away from school to tramp through the woods along some dreamy river is as much real adventure as many a boy ever experiences. And it is adventure to follow a fresh track in a muddy riverbank or to answer a strange birdcall. For there is always the hope of making a new discovery about the things of nature.

It was such a hope that led Roy Chapman Andrews to roam the woods around his little Wisconsin town until he had gathered firsthand information about every bird and animal in the region. He kept a careful record of his observations. He made a collection, too, of interesting birds and mammals, teaching himself to mount his specimens from reading.

By the time he was through school, Andrews was ready for new adventure. He found it in the American Museum of Natural History, where he scrubbed floors, mixed clay for modeling, and helped prepare animal and bird skins for mounting. In fact, he did any odd job that was offered. Nothing about the Museum was ever dull to him.

There came a day, of course, when Andrews was graduated from odd jobs. He had been assigned to assist in building a life-sized model of a whale. And the whale was, and still is, pronounced a good one. Since that time Andrews has known steadily greater adventures. He has directed a whaling expedition to Vancouver, gone deep-sea dredging among the East Indies, hunted tigers in Manchuria, and made motion pictures of seal herds in Bering Sea. He has, as he says, gone to the "Ends of the Earth" in the capacity of naturalist and explorer. All this time he has continued to keep records just as he did as a boy. From these records he has written a personal account of his experiences in strange, far-away places. The following selection gives you a chance to share some of his adventures and feel some of the thrills that he has found in his travels.

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What would you do—

If you had to find your own food for ten days on an uninhabited island in the South Pacific?

Life in a crowded city or in a small village offers many kinds of challenges to young men and women. Usually these young people solve their problems with the aid of other people. That is what Roy Chapman Andrews would have done, had he been able to do so, when he discovered that his ship would not arrive in time to keep him from hunger. He could not send

one of his black companions to the nearest grocery store for supplies. He had to make the best of the situation as he found it on this small uninhabited island.

1. How would you have kept from starving if you had been in Roy's place?
2. Andrews and his companions feasted on roast monkey. Now it is one thing to eat an animal you have captured, but it is another thing to capture it. How would you have set about capturing those tree-climbing monkeys?
3. Andrews caught fish with a homemade net. How would you make a net strong enough to catch fish large enough to satisfy your hunger?
4. Andrews evaporated salt water to season his food. Would you know how to evaporate salt water if you did not have a box of ready-made safety matches to use in building a fire? Explain your method.
5. Andrews knew how to protect himself against wild life on the island. How would you guard against attack from animals, or from stings by deadly insects?

* * *

WANTED: LIVE ELEPHANT FOR AN AMERICAN PLAYGROUND

Probably no big-game hunter today has had more daring exploits than Frank Buck. His almost unbelievable experiences in bringing back alive wild animals from the jungles of Africa and Asia have become familiar to us through his books, motion pictures, and radio broadcasts.

If you visited the Century of Progress Exposition in Chicago, you probably enjoyed Mr. Buck's exhibit "Bring 'Em Back Alive." There you found yourself surrounded by peculiar wild creatures of the jungle. A whole colony of monkeys chattered and fought over your bananas, lettuce, popcorn — anything you chose to toss them. Orangutans, wild dogs, porcupines, cobras, pythons, rare

songbirds, and a variety of other animals, reptiles, and birds furnished evidence of Frank Buck's ability to bring 'em back alive.

How does he do it? According to Mr. Buck there is no special way. You can't capture all animals by the same method. Apparently, the trick needs tact, presence of mind, persistence, a tough constitution, and a few other qualities that you find useful even in less adventurous undertakings than wild-animal hunting. To answer the question more directly you need to read many of Mr. Buck's experiences in capturing first one and then another of the jungle people. The following story is taken from his book *Bring 'Em Back Alive*. It shows how Mr. Buck turned the trick in time to save Babe, the Burmese elephant, from getting the upper hand in a lively struggle.



What would you do—

If you were asked to capture and train a wild animal?

1. If you were commissioned to capture and train a wild animal, it is not very probable that you would be called upon to train an elephant. So let us say you were invited to train a pet for a small child who is an invalid, but who is very fond of animals. Suppose you are going to train a young fox. Can you get an idea of how to go about training the animal from Frank Buck's account of his attempts to train elephants to pull carts filled with children?
2. Since you know that the animal is wild and afraid of people, how would you go about winning its confidence? What would be the value of bringing the fox food and water at the same hours every day? If you allowed the fox to run about the yard, how would you teach it not to run away? How would you teach it not to be afraid of cats and dogs since it must become accustomed to living with cats and dogs around the house? How would you teach the fox to obey the little invalid and not other people?
3. What do Frank Buck's experiences tell you about how to win the confidence of any wild animal or bird?

CAPTURING WILD DOGS IN NEWFOUNDLAND

If there is any animal that seems to form a natural attachment to human companions, it is the dog. To trot at their sides, to lick their hands, to guard their homes, to share their very lives, all give him supreme joy and satisfaction. Not an activity do they engage in that fails to arouse his personal interest.

To be sure even dogdom knows its ne'er-do-well. The stray dog, the tramp dog, living his lonely, carefree life, is altogether too common. But don't you find it hard to believe that his vagabondage is of his own choosing? How often a wagging tail, a friendly glance, a curious sniff, a brief trot at your heels seem to entreat your permission to be adopted. Then—finding you indifferent to his timid pleading, he turns aside to await another comer who may prove more responsive.

But the dog has not always enjoyed human companionship, nor has he always sought after it. He is descended from wild ancestors who plundered for food with the pack, who fought for leadership, and then fought to protect and cherish their comrades. All the traits we admire in the dog today—fun, loyalty, tenderness, friendliness—were exhibited, too, by his ancestors. And they were exercised by their possessors among their own kind long before they knew other companionship.

The story you are to read next gives you a chance to know dog nature as it is found in its wild owners. And it gives you also an opportunity to observe some of the qualities of human nature that help to make life interesting.

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1. Everybody knows that all of our domesticated animals belong to families of wild beasts. Scientists have always been interested in tracing the history of man's attempts to tame wild animals. What have the natural scientists discovered about the history of the modern horse, the house cat, the mongrel dog? If you cannot answer this question, you should consult a good encyclopedia.
2. Have you ever visited a zoo or the menagerie of a circus? If so, have you found yourself pitying the beasts imprisoned

in their cages and wishing you could set them free? Why did you feel the animal would be happier in his wild state?

3. Read the last paragraph of the story and plan to debate the question: *Wild animals deserve liberty as much as humans.*



THE HORSELESS CARRIAGE

A very curious and a very important change has come over the people of this country in the last fifty years. It is a change in their way of looking at new inventions and at new ideas. You will see how it was fifty years ago in this story of the automobile.

Everybody laughed at the first automobiles. Of course the first automobiles were very funny-looking things and probably deserved to be laughed at. But more than that, people fifty years ago scorned the very idea of an automobile. Horses were good enough for them. They could not see any need of moving faster than horses could carry them. They looked upon automobiles as a positive menace to the peace of the city and countryside.

Now everything is different. People are actually impatient for new improvements. When a new invention like the radio or the talking moving picture comes along, people give it great applause and eagerly await the improvements that they know will come.

You will be thinking about this important change in people as you read this article.



1. You are told frequently that history repeats itself. Years ago the public scoffed at the steamboat, the steam-drawn train, the telephone. Men said they were satisfied with old methods of doing things. In 1898 they were again doubtful of the value of something new. This time it was the "horseless" carriage. Why did men distrust this new invention?
2. Can you imagine reasons why the United States had outgrown the use of horses in transportation?

3. Why is cheap fuel said to be responsible for the widespread use of automobiles in America?
4. The interesting thing about the American automobile has been its improvement. Can you name some important changes in the automobiles of the last five years?
5. What new and unusual idea did Henry Ford have about automobiles? What did he do for the average American who wanted to own an automobile?
6. What new inventions do you know that have not yet reached the stage of common usage? Have any of them suffered from our distrust in their usefulness or from our fear as to their safety?

* * *

TWO AMERICANS TAKE OFF!

Someone has said that the American slogan is "Let's go!" Perhaps he should have said it is "Let's go—fast!" For we are living in a swiftly-moving, high-powered age. We are obsessed by the spirit of speed. It makes no difference where we go, we must waste no time in arriving. Of course, the airplane best fits our hurrying natures. And so air-minded have we become that we accept the airplane without much thought, just as we do the railroad or the motor car. Only when a speed record is broken or a new long-distance flight has been recorded does the airplane command our attention as something very remarkable.

Yet the airplane is new in the history of transportation, as you know. It was 1903 when Wilbur and Orville Wright, makers and repairers of bicycles, took to the air and proved that man can fly. Can't you imagine the excitement in the little village of Kitty Hawk, North Carolina, when the flying machine, "Kitty Hawk," lifted itself into the air on its own power, remained there a fraction of a minute, and came back to earth without a mishap? For hadn't everyone been predicting that no good could come from "fooling with such contraptions"? Yet here was the impossible thing actually being accomplished!

As you read this story you will realize how much progress we have made in the last half century in speed of travel. This is just one of the many interesting stories about the Wright Brothers and their experimentation with flying machines. Perhaps your librarian will help you find others.

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1. What did the Wright brothers learn about aviation from their experiences with box kites?
2. Someone has said that the Wrights were more interested in improving their latest development than they were in making the airplane which eventually was developed. Can you explain this?
3. What were the three problems they knew they must solve in order to make a heavier-than-air machine?
4. History tells that the Wright brothers invented the airplane, but it says little about the contribution of their sister, Katherine. In what way did she help in developing the airplane?
5. When is the birthday of the first real American airplane?
6. How did aviation gain from the Wright brothers' dissatisfaction with their first flight?
7. Name five ways in which the airplane is used in everyday business.

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THE HARVESTING RACE

Whether you live in a small town or a large city, you probably long for the day when you can visit a farm during harvesting time. You think it is great sport to wander through the orchards picking fruit as you go, to climb up into the barn loft, high under the eaves, and then jump down into the sweet-smelling hay, or to slide down a stack of glistening new straw. Again you may think it is a real adventure to climb into the wagon rack and ride through the fields

of shocked grain. To the city or village boy all these activities are pure adventure. But to the farm boy who must rise at dawn, finish his chores before breakfast, and join the men in the fields by the time the dew is off the grass, they are hard work as well as adventure.

Village boys who work in grocery store or garage can learn the tricks of their trade by spending only a part of their time on the job. Farm boys are learning their trade from their fathers all day long on the home farm. With every job calling for strength, the farm boy must learn to work quickly and efficiently. This is the only way he can hope to earn a good wage for his labor. He must learn how to co-operate with his neighbors so that his crops will be harvested before the fruits are wasted or spoiled by exposure. He must learn, too, to direct the work of large gangs of men during the busy season. In the days before the reaper and the binder, these harvesting gangs were far more important than they are today. Then they went about the country harvesting a farmer's crops "on shares." To keep up with the gang was every farm boy's ambition in the early day.

In the story which follows you will read about the rivalry of two brothers who worked on the farm in summer to earn the money which would prepare them for less strenuous jobs. Later these brothers became famous, one as a preacher and the other as a great doctor. In his book *The Doctor*, Ralph Connor tells what happened when both of these brothers fell in love with the city girl who came to teach school in their district.

One hint about *The Doctor*—it is not a story of farm life.

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Harvesting of crops has always been a problem for the farmer. The amount of grain or fruit collected partly determines the reward of the farmer. The first attempts at harvesting were very crude. Each man worked with his own family in gathering and storing the fruits of the harvest. With these individual methods a farmer could gather little more than enough for his own needs from one harvest to another. Better methods had to be found.

1. What was the advantage of the harvesting gang over the old method of a man and his family gathering grain?
2. The boys had a system in their harvesting. Even with their system and their great endurance could they win against a machine which both reaps and binds in one process? What advantages does the machine have over man in doing work efficiently over a long period of time?

* * *

GRASSHOPPER BATTALIONS

Have you ever been attacked by mosquitoes or by big black flies when these pests were so numerous that you had difficulty chasing or swatting one from your skin before another stung you in a more tender spot? Have you ever been chased by a swarm of bees? Perhaps not. You may have seen a picture of a man attempting to escape a thousand buzzing, stinging insects, a host of enemies much too numerous for him. Imagine a swarm of grasshoppers ten thousand times larger than any swarm of bees, mosquitoes, or flies you have ever seen, and you have a small part of the army of grasshoppers which settled down upon the fields of Iowa and Kansas in 1876.

If the farmers had been flying in airplanes and been armed with poison gas with which to spray the clouds of grasshoppers as they moved with the wind, the crops of Iowa and Kansas might have been saved. But the settlers did not have weapons of these modern types. The clouds of grasshoppers crept up on their farms with the quickness of a strong wind. And the farmers were helpless to battle them. Everything was swept down before them — every blade of grass, every leaf on the trees, every object that was soft enough for their gnashing teeth.

In her story, *Let the Hurricane Roar*, Rose Wilder Lane has given an account of the struggle made by some of her ancestors on the plains of Iowa. As she tells the story, the author does not attempt to make a happy ending. For the facts of history show that the grasshoppers destroyed the fields of all vegetation. But

what history does not always tell is that the hordes of enemies could not kill the spirit of the people. Plan to read the whole story. It is a small book, one which you can read in a couple of hours. Yes, you can read it in a short time, but you can't forget it.

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Scientists tell us that if man stopped fighting insects for five years the insects would increase in such large numbers that they would consume all the food that farmers could grow.

Grasshoppers are ever-present enemies of farmers. Although the farmer does not succeed in destroying them, he does succeed in keeping them under control.

1. Why was it impossible for Charles and Caroline and their neighbors to stop the plague of grasshoppers?
2. How do farmers today go about fighting an insect horde?
3. What does the United States Government do to protect farmers against insects?
4. Do you know how the airplane is used in controlling insects? See if you can find information in your school library about the subject "insect control."
5. What insects other than grasshoppers do farmers fear? Remember that insect enemies vary in different parts of the country.
6. Show how this story could be well adapted for a motion picture.

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THE WHOLE WORLD FILLS YOUR MEDICINE CHEST

A healthy body is an ideal you don't need to sell to anybody these days. All of us probably appreciate the need of "Keeping fit." We begin the day with cold showers and orange juice. We eat our spinach, regulate our exercise, and sleep eight hours out of twenty-four. We dress, too, to suit the weather. And why? Be-

cause medical science has shown that we can prevent many diseases simply by following the laws of healthy living.

But keeping fit is not always so simple as this. Sometimes we overwork or overplay. There is no use trying to deny the fact. We can't "rest up." At other times a weak heart, a stomach ailment, or some other organic weakness breaks down our usual good health. Or we find ourselves victims of a contagious disease. Now our ordinary attention to diet, rest, sunlight, and exercise is not enough. So we turn to the source of modern miracles—the medicine chest. What we find there represents the contribution of doctors, scientists, and research workers for hundreds of years. All these persons have been laboring and sacrificing to discover the cause and cure of disease. It represents the labor, too, of countless others who are constantly at work to breed the plants and animals needed in producing remedies to cure our bodily ailments. In the following selection you will see what a great army of workers devote their lives to keeping the rest of the world healthy.

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You have probably tasted cod-liver oil at some time. Almost everybody has. Well, reading about the preparation of the oil is a lot more interesting than taking a full tablespoon of "the stuff."

1. Which is the more important, the way codfish are caught or the way the oil is tested before it is sold to the drug stores of the world? Why?
2. Describe the process of the laboratory that makes cod-liver oil good for building strong bones and teeth.

People are becoming more interested in the efficiency of their hearts than ever before in the history of medical treatment. In a few months you will see machines standing in doorways and near the entrances to busy buildings. These machines will test your heart and give you a picture of its action for a penny. These machines will make people more conscious of the strain which they place on their hearts.

3. What drug did an old English physician discover by trying to run down some gossip about home remedies? What other good remedies were discovered by accident?
4. Some medicines are really manufactured within the body. Name some medicines of this sort.
5. Every boy who plays athletic games knows something about ringworm. Some boys call it athletic itch. What does the author tell you about it?
6. Describe the experiments of scientists which have helped to take the fear of death from the dreaded diseases of typhoid fever, smallpox, tetanus or lockjaw.

Every drug store is a library for interesting stories about scientific laboratories which make and test products for your medicine chest.

* * *

HUNTERS WHO SEARCH FOR NEW PLANTS

How much have you discovered about the history of the foods you eat? Of course, you know that no colonial boy or girl ever had grapefruit or orange juice for breakfast, or a crisp leafy salad for lunch, or a chocolate ice cream sundae for dinner. Yet these colonial children were reasonably well fed. Game was abundant. Wild berries hung thick on the bushes. Indian corn supplied both bread and cereal. And a few gourds grew in the Red Man's garden. But undoubtedly there were times when they complained about the sameness of the food and wished for a more varied diet.

Today our menu is enriched by every new food the soil will produce. And in our fields and gardens are to be found grains and vegetables once wholly unknown here. Where have these plants come from? In the beginning, European emigrants brought seeds from their native lands to sow in the new soil here. Then later the American government sent plant hunters to every part of the globe in search of plants that might be cultivated successfully in this country. Today these explorers of ours are everywhere — in

China, Africa, Russia, South America, even in the tiniest islands of the West Indies. The plants, tubers, and seeds which they collect are packed carefully and shipped to the United States with greatest speed. Whenever possible, the most perishable ones travel by air express.

The selection that follows is an interesting story of a few of our plant immigrants. If you care to read about some of the thrilling adventures experienced by the plant hunters, you can find them in your school library.

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1. Make a list of plants that you know have been imported to the United States.
2. Why is the United States Government interested in finding new plants for growth in the United States?
3. What foods do we import from other countries?
4. What are some of the most successful results of the Bureau of Plant Industry in introducing new plants to the country?
5. What advantages would there be to the United States if a bamboo plant which could be grown successfully in this country were found?

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FILMING AN AIR FIGHT

Have you ever seen a magician pull a rabbit out of a hat? If you have, you will remember that you knew he did not have the animal concealed in the hat. You knew you were being fooled by his magic art. You knew that what you had just seen was a trick. However, you marveled at the skill of the man who performed the trick. Everybody does.

If you listen to the excited conversation of the people who have just witnessed a moving picture in which the aviators performed dangerous stunts in taking the picture, you will hear different people say:

“I can’t understand how they make these pictures. I know that the actors are not killed or seriously injured in

the smashup, but I can't figure out the method. It is a trick."

People have said the same thing about the tricks of the stage magician.

After you have read the following story, you will be able to explain in a small way the dangerous work of the men who make the aviation thriller seem real in every way.

*

1. Compare the quick thinking of Bob King with that of other air pilots of whom you have read.
2. You know more about the feelings of the writer than you do about those of Bob. The writer first felt *wonder* at seeing Bob's plane dip, then *alarm*. Continue listing the writer's feelings and see how many you can discover as you read.
3. How would the seat-pack kind of parachute have prevented the near-tragedy told in this story?
4. One of the reasons you can see the events of this story as you read is that they are told vividly. What are some of the most vivid words?

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WALT DISNEY MAKES A MICKEY-MOUSE FILM

Are you one of the millions of moving picture fans who, during an exciting part in a Mickey Mouse adventure, turns to your companion to whisper: "How do they make these films? I can't understand how the animator can get his effects from a series of drawings." If you are interested in the mechanical side of animated films, you will enjoy reading this story which tells how Mickey came to join the moving picture colony and how the lifelike effects are produced by Mickey's creator, Walt Disney.

Walt's friends say that he is somewhat bewildered by his sudden rise to fame as the creator of the most popular animated films in the world. However, his success with animated films is not an

accident. For he has learned to take advantage of his opportunities ever since the Disneys moved from their Missouri farm when Walt was eight. His first business venture started in Kansas City at the age of nine when Walt had a morning and evening paper route. At fifteen he became a "peanut butcher," a boy who sold peanuts and candies along with his papers on railroad trains. Each experience taught him that he must work for whatever he wanted. Later he began his education in cartooning in a night school. While he was working his way through night school, he answered an advertisement for a job with a firm which made moving picture advertising cartoons. This job started him in the manufacturing department of the moving picture industry. In this office he discovered a new use for animated characters in moving pictures. But you can finish the story yourself if you read the following adventures of Mickey Mouse and his creator, Walt Disney.

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Theme Assignment

Write a short theme on one of the following topics:

Why I Like or Dislike Animated Films

Mickey Mouse, A National Hero

Silly Symphonies — The Modern Book of Fairy Tales

New Adventures for Mickey Mouse

(In this last topic, suggest the stories which you would use in making a Mickey-Mouse film.)

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FIGHTING FOR A FOOTHOLD IN THE WILDERNESS

Truth is stranger than fiction. You have heard this remark many times, haven't you? If you doubt the statement, you should read this account of the experiences of some of the early settlers in one of the richest farm lands in Eastern United States.

Here is a personal record of what happened to the people who braved the terrors of the wilderness in order to find homes and be free from the shackles of debt and imprisonment.

After you have read this short historical account, try to find materials in your school library which will tell about the early settlers in your own community. You may discover that they, too, paid a price far greater than can be expressed in mere dollars and cents.

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This is a true account of real hardship by the father of James Fenimore Cooper. Cooper, you remember, is the author of *The Deerslayer*, *The Last of the Mohicans*, *The Spy*.

It is easy to imagine how young Cooper was able to write such thrilling stories of the early American pioneer period after you know that his father actually took part in these struggles.

1. This story shows modern Americans how pioneers won the battle of existence against very great odds. What forces did they overcome in winning a foothold in the wilderness?
2. Compare the story of Roy Chapman Andrews abandoned on a small island with the story of these people marooned in the wilderness of New York State. What methods did each of them use to secure food?
3. Can you remember any cases where men in your time had to fight for food in the heart of great cities? What caused the hardships?

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A PIONEER BOY REMEMBERS

Have you ever enjoyed the real fun of roughing it — that is, roughing it on a camping trip far from the comforts you enjoy at home? If you have, you know how you boast of the hardships you endured. Yet you chose to endure them for the real fun of it.

Has it ever occurred to you that sometimes children of pioneer families found themselves delighting in the memories of early days just as you delight in recalling your hardships on a summer vacation trip?

Looking back on hardships is usually a great satisfaction, whether you look back on your own or some other person's experiences. It may be this human tendency which makes you enjoy the kind of story that Wayman Hogue tells in the selection that you are to read next.

Wayman was a mountain boy who lived in a homemade cabin in the Ozark Mountains. When he grew to manhood he wandered down from the mountains and learned to enjoy the comfortable conveniences of a more modern home. Yet, in the midst of the new comforts, he found his mind wandering back to the experiences of his boyhood in that crude mountain cabin. Possibly because he could not forget them, or because he knew people would enjoy his stories, he has written his remembrances in a book called *Back Yonder*. The following selection, taken from that book, will make you want to read the rest.

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1. What modern conveniences do you enjoy which Wayman Hogue did not?
2. Do you think you are any happier than he was with all his hardships? Why?
3. Have you ever been riding in an automobile when the driver of the motor car suddenly said, "Bet we're out of gas"? What did he do? Is there any similarity between carrying "a chunk o' far" and walking to the nearest gasoline station?
4. What were some of the home industries of Wayman's boyhood?
5. Name some duties of girls in the family then and now.

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BEFRIENDING THE UNDERDOG

Have you ever seen a man or woman break into a circle of boys watching a dogfight? And have you noticed their attempt to

save the smaller dog that is getting the worst of the battle? If you have, you have seen how the underdog wins sympathy by the way he fights against a larger and more powerful opponent. All of us support the underdog at some time or other. If the chance to do so doesn't come in real life, it is apt to do so in a storybook experience.

Perhaps it was because he felt this sympathy in fair play that John Fox, Jr. wrote the story you are to read next. And probably it is this sympathy, too, that will make you enjoy watching a small mountain boy and his dog fight to win against strong opponents.

Chad and his dog, Jack, are the heroes of this story. As the story opens, Chad is a little fellow who knows how to fight and win according to the best rules of the game. At an early age he had lost his parents and had been bound out to a man who was very cruel to him, making him do all the chores about the mountain farm. Finally Chad took advantage of an opportunity to escape from old Nathan. Fearful of being bound out to another master like Nathan, Chad took his old gun and dog and fled into the mountain fastnesses. For a few days he hunted and lived by his knowledge of the out-of-doors. Then he realized that he must cross into new parts of the Blue Ridge Mountains.

It is here that you meet Chad, on his way to find a new home. It is here too that he meets some mountain children with their big dog, Wheezer. Things are bound to happen in a situation like this, and they do — fast enough, as you will soon discover.

This story is just the beginning of an interesting book that you should plan to read. Ask your librarian for it, and she will be glad to lend you *The Little Shepherd of Kingdom Come*.

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1. Someone has said that a man is never lonesome if he has a dog. Why?
2. Chad possessed an unusual amount of wisdom for a little fellow. Give some examples.
3. Name several things Chad did which show that he was trained to live in the open. If you have been trained as a

Boy Scout, can you tell the class whether Chad would have passed the test for living in the forest?

4. Why does every boy think his dog is the best fighter?
5. What is the meaning of the phrase—the underdog in a fight?
6. How did the feeling of the strange "children about "the underdog" pave the way for friendship with Chad?
7. What is often considered more important in a fight than winning the battle?

* * *

TOWING A CANAL BOAT WESTWARD

This is the story of a great and powerful horse, Jan Kip. It is also the story of a pioneer family and how they moved to the West from Pennsylvania. Today Illinois does not seem to us to be very far west. But to the Moore family it was a long journey. In those days railroads existed only in the dreams of inventors and promoters. The cheapest and the easiest way out to Illinois was by water. So the Moore family started their journey by floating down a river in their houseboat.

But the river did not carry them far enough, and it was necessary to get across country to another river that would take them to their new home. Part of the way across country they went by canal. In those days canals were crowded with travelers. And down the canals went the most curious variety of rafts, houseboats, and scows all pulled through the water by horses. All day long the horses plodded along the banks of the canal, while the boats, hitched to them by long ropes, moved lazily behind them. Some of the horses came to be known all up and down the canal for their ability to pull a heavy load.

Jan Kip was a famous horse. You will read about him and his family in this story of pioneers. If you are interested in Jan Kip, and you surely will be, you will want to read the whole book from which this story is taken. The book is called by the inviting title, *Horses Now and Long Ago*.

1. Why was the horse one of the most important things to think about in planning a trip by canal routes?
2. What experiences did Jan Kip have which made the Moores decide that he was the best horse to take on the westward journey?
3. What was Jan's relation to the horse that had won the race against the steam engine years before?
4. Compare little Peter's love for Jan with Chad's love for his dog, Jack. (Remember Jack had a fight with Wheezer.)
5. How long did the journey to the Moore's new home last?
6. If Jan had kept a diary on the westward journey, what interesting events could he have entered in it?

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THE PEARL DIVER FINDS HIS BIG PEARL

Adventures wait for everyone who goes to the South Seas. In the following story Victor Berge tells you some of his adventures. He was searching for wealth in a most unlikely sounding place — in oysters! And he found it.

You probably know that an oyster will start building a pearl around some piece of sand or foreign matter that has settled inside its shell. Its building material is soft to begin with and hardens only after years of building and polishing. The color of the pearl is determined by the color of the inside of the oyster shell. This inside is what we call mother-of-pearl.

If you like this story, try reading the rest of Mr. Berge's adventures in *Pearl Diver*. They were told by Mr. Berge to the author and publisher, Henry W. Lanier, whose stenographer, sitting just out of sight of the storyteller, took down every word he uttered. Later as Mr. Lanier wrote the story for publication, he took care to make as few changes as possible from the stenographic notes. The result is such an intimate and natural kind of story that you can almost believe it is being told just to you.

- Hitchhiking his way around the world is likely to lead a vagabond into some very interesting places. Can you imagine a more interesting place to find adventure than on board a pearl-lugger? Berge found adventure in pearl fishing but he found a great treasure in the friendship of his benefactor, the man he speaks of so affectionately as "Uncle." Can you think of some good friends you have made in strange out-of-the-way places?
- Berge said that "Uncle" was a shrewd trader. How does Uncle's offer: "You catchem pearls; I catchem shell" prove that the old Chinese was a good business man?
- How did Berge discover that "Uncle" believed that a bird in the hand is worth two in the bush?
- Someone has written that most great discoveries are accidental. What discovery did the pearl diver make by accident which proved the saying and opened the way to a greater discovery?
- When the pearl diver rolled his big pearl in his hand he said that the pearl meant more than money. Why? What did he mean by—"going back to Sweden to show them he was somebody"?

* * *

FINDING TREASURE IN A SICK WHALE

There used to be an old whaling-song that ran like this:

"Oh, the rare old Whale, mid storm and gale
In his ocean home will be,
A giant in might, where might is right,
And King of the boundless sea."

This song was sung to a rousing tune, and when boys no older than you heard the lines, they longed to hunt the giant sea king and challenge his might. If they could only experience the thrilling

dangers and sudden triumphs known only to the whaling business, they would be content. Many of them gave way to these longings, and "running-away-from-home" became a popular escapade.

Few boys went with either the consent or blessing of their parents. George Tucker, who wrote the next story, was an exception. All his life he listened breathlessly to his sailor-father's stories. He remembers them as exciting stories of "angry whales smashing boats and chewing them to bits; of towing whales to ship and cutting them in and trying them out; of losing the ship and remaining all night in the open boats; of encountering great storms and riding them out in safety; of meeting after many months another New Bedford vessel, and getting the latest news from home, and of visiting the Pacific Ocean Islands inhabited by savages."

As he listened he determined that some day he would go to sea like his father and take a hand in the mighty business of whaling. Saturday afternoons found him roaming about the wharves, venturing on board ships only to be driven off by the crew.

The years passed and there came a day when George was off to sea with his parents' consent. But he started with more than that — an elaborate equipment. Bedtick and pillow, needles and thread, combs, shaving outfit, everything that parents can think of, went with him. No wonder the crew labelled him "Fancy Chest."

Here you can read the story of his first whaling adventure. Other of his experiences are told just as entertainingly in *The Boy Whaleman*.

*

Do you like the fragrance of good perfume? Have you ever noticed that sometimes the aroma of a perfume disappears almost as soon as the air strikes it? Well, for centuries women noticed that the perfume of flowers did not last long enough. The women wanted the fragrant smell to linger for a long time. The makers of perfumes wanted to sell perfumes which lingered as heavy mist about the person. Numerous substances were put into the perfumes to hold the fragrance of the crushed flowers. Two of these substances were musk and ambergris.

Ambergris is a substance found only in the livers of sick whales. Now every whale is not a sick one. Consequently ambergris is hard to find and for that reason is worth its weight in gold.

1. How does this fact explain the finding of treasure by the boy whaleman?
2. What sideline had the galley cook developed as a source of extra money? Have you ever helped your grandmother make soap from the renderings of fat?
3. What was the double reward which came to the first person to discover a whale?
4. Why did the rough sailors jolly "Fancy Chest"?
5. What other types of reward have you read about in this book which indicate that the sea is a rich source of wealth?

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WINNING AN APPOINTMENT TO ANNAPOLIS

One summer day in 1934 the wireless operator at the United States Naval Station of the Panama Canal Zone heard a frantic appeal for help. Three Americans had just dropped the anchor of their forty-foot sailing yacht in the harbor of a little island of Galapagos, 600 miles away. One of them, William Robinson, was seriously ill with acute appendicitis. There were no doctors in Galapagos. Robinson was too sick to try to make the trip back to Panama. And nothing but ocean lay ahead. Immediately a small Navy ship was despatched to Galapagos bearing a doctor aboard. Instructions were sent ahead by wireless to keep Robinson perfectly quiet until help arrived. Within a few days, the sick man was in the marvelous hospital at Panama and on his way back to health.

Of course this story is not typical of the work of the United States Navy. But it does illustrate the point that the Navy's job is to protect the lives and property of American citizens at home and abroad.

American naval vessels guard Alaska. American gunboats are to be found in Chinese ports. There is a naval base in Hawaii. If trouble arises in Central America, an American destroyer appears on the scene, and things quiet down. "Join the Navy and see the world" is by no means an empty slogan.

In the following story, which is the first chapter of the book, *Won for the Fleet*, you will meet Tom Poor. You will read one of his adventures in the Navy. If you like this story, you may want to read of his adventures at that greatest of all naval training schools — Annapolis.

*

1. Can you explain why reading thrilling stories is often as exciting as living the adventures?
2. What occurrence caused the village policeman to be suspicious of a flickering light in an upstairs room?
3. What in Tom's manner made the officer sure that Tom was the man qualified to accompany him on a dangerous mission?
4. How did quick thinking and acting win Tom recognition?
5. Why was an appointment to Annapolis a special honor for Tom?

* * *

MISSISSIPPI STEAMBOATIN'

This interesting story will carry you back seventy years to the time when steamboats traveled up and down the Mississippi River carrying passengers and freight. The Mississippi was a treacherous river. Its course was constantly changing. Sandbars grew up over night in midstream. Whole sections of bank that might have been a pilot's landmark for years would slough off into the river overnight. It required great skill and a good memory to pilot a steamboat down the river.

The responsibility for the journey generally rested with the pilot. If he was a good pilot, he memorized the position of every stump, barn, tree, and church along the river. As the "King of the River" he held the safety of ship, cargo, and passengers in his hands.

Being a pilot was often a family affair. It was a profession handed down from father to son to grandson. With these family traditions at stake many a Mississippi pilot gallantly risked his life to uphold the family honor. The history of "the river" gives many accounts of family fortunes ruined by defeat or saved by victory. And it was through victory that a pilot won for his craft the title "The best boat on the river."

*

Library Assignment

The Mississippi river has been the theme of many songs and stories. Every American should know the history of this great river, for the growth of the American nation has been in a way the development of the Mississippi valley.

1. Go to the library before you return to class for the next recitation and try to find something about the history of this important river. Read the articles in any encyclopedia on *three* of the following:

Pere Marquette
New Orleans
Robert Fulton
bayou
levee

Vicksburg
Jean Lafitte
Mississippi river
delta
Jim Bludso

Make a list of the interesting facts which you discover and come to class prepared to discuss your topics.

2. Contrast the dangers of traveling by water at the time of this story and now.

*

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"FLYING CLOUD"

In 1851 there were no airplanes. Neither were there any trans-continental trains. There wasn't even a Panama Canal. And, as you know, there was no quick way to get mail across the great

American continent. To reach California it was necessary to go by land across prairies, rivers, mountains, and deserts in a "covered wagon." Or you might go as Jabe Thompkins did—in a ship like the *Flying Cloud* around the very southernmost tip of South America. Neither route was pleasant, and both were filled with hardship and danger.

Today America leads the world in modernized speedy transportation. Our trains, our automobiles, our airplanes are the envy of other nations. In 1851 America was master of ocean travel. Yankee-built sailing vessels, "clipper ships" as they were called, were the speediest vessels afloat. They must indeed have looked like flying clouds as they raced over the water with their white sails filled out in the wind.

In the following story you will read about one of the most noted of these clipper ships, *Flying Cloud*, and of its famous trip to San Francisco in 1851. You will also read about the adventures of gold mining in California. In those days, gold was plentiful in California, and the ordinary provisions of life, like clothing and food and tools were scarce. These two circumstances partly explain why coffee cost four dollars a pound and cowhide boots, forty-five dollars a pair.

*

1. If you are a landlubber, that is, a person who lives and works on the solid earth, you will probably find some difficult words in this salty tale of the sea. In Jabe's day, boys sailed as cabin boys until they knew the language of the sea well enough to understand all the commands given to regular seamen. Make a list of sea terms which Jabe had to master in order to be raised to the rank of ordinary seaman. How many can you name without referring to your book?
2. "Come easy, go easy" is the usual explanation for a man who spends his money too freely. Was this true of the miners in the gold fields?
3. Why were supplies so very expensive in California?
4. Compare the record of the "*Flying Cloud*" from coast to

coast with modern traveling records made by airplanes, automobiles, and steam trains.

5. Why did the sailors sing chanteys when they drew up the anchor?
6. What accident prevented the "Flying Cloud" from making even a better record than it did?
7. The clippers were the first streamlined ships to sail the sea. In what way has the model of the clippers influenced modern means of transportation?

* * *

THE PONY EXPRESS RIDER

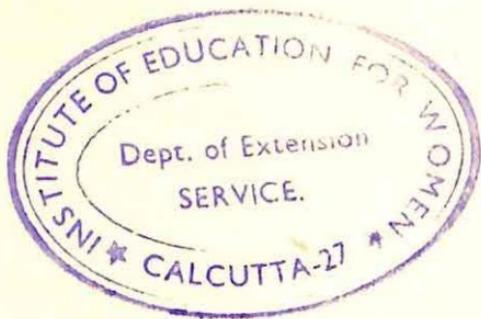
Most of us like a good hero tale. And if it is a favorite one we read it again and again. Do you happen to know why? Probably the hero of the tale represents ourselves as we should like to be. He is a person who can face reality. He overcomes the greatest obstacles and faces the gravest crises with a clear, calm mind and supreme courage. As we read, the reality of his deeds inspires us to new desires and purposes and renews our faith in ourselves.

This story of the pony express is an American hero tale. Its characters are real flesh-and-blood heroes whose dramatic escapades are well known to all of us. Yet we always feel a thrill of excitement as the daring rider leaps on his pony's back and gallops away across the plains over a long and dangerous trail. We know, as he does, that his safe arrival at the next relay station is a matter of chance. But he has been entrusted to carry the news between the far western gold fields and the East, and, regardless of risk, "the mail must go through." As you read the following story, see how easy it is to identify yourself with these heroes of pioneer America.

*

1. The Pony Express was merely a short link in the history of carrying messages to California. What other inventions made the life of the Pony Express a short one?

2. The Pony Express was founded in 1860. Why were the people in the East happy when they learned that the "mail had gone through to the Pacific Coast"?
3. Name three other types of transportation which helped make the first transcontinental mail delivery a success.
4. What was the most important idea in the mind of the Pony Express rider? What other stories have told you about this same spirit in types of mail delivery?
5. How long was the Pony Express in existence?
6. Name several other types of transportation which have been made old-fashioned and out-of-date by newer inventions?



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